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JUL 9 1943

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Allied tanks wheel into battle, striking to the right and left, pivoting to forestall sudden flanking threats.

This maneuverability is obtained thru a braking mechanism which pivots the tank on its own tracks—and here again Hughes Tool Company is helping to speed production for a quick and overwhelming "break-thru" to Victory.

Finely finished brake drums and other parts for these assemblies are being turned out on Hughes production lines—production lines developed thru years of experience in manufacturing highest quality tools for the essential oil well drilling industry.

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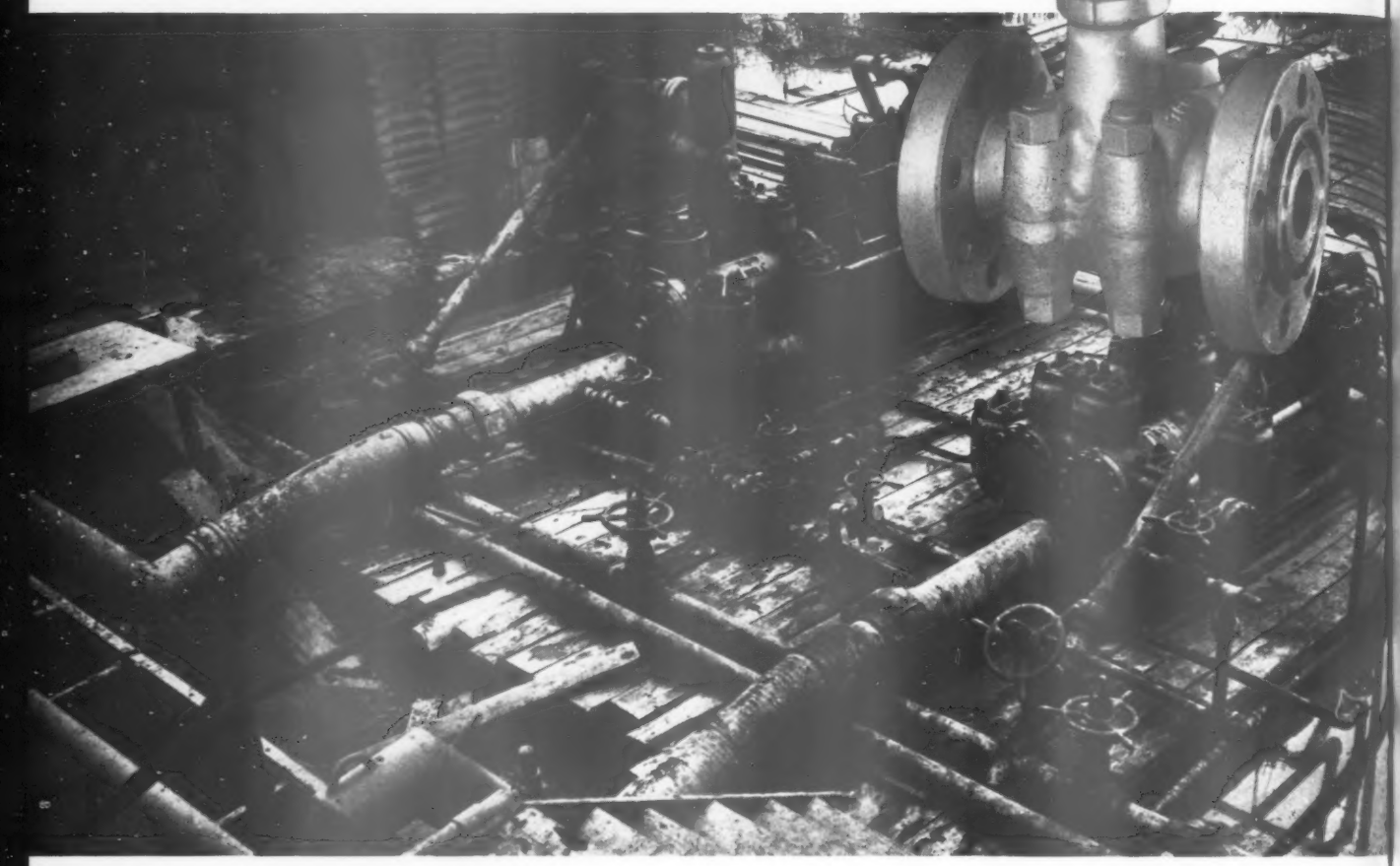
PRICE 20 CENTS JULY 8, 1943

CAMERON

Flex-Seals

SAVE RIGGING UP TIME

BUY WAR BONDS REGULARLY
★
Let's Keep America Free!



Hubs and flow-way insert assembled in the lower half of a Cameron Flex-Seal Valve body. Note the interlocking shoulders and grooves which attach the hubs to the valve body and which permit the valve to swivel like a union when making up in a manifold.

. . . they swivel like a union when making up in a manifold

Cameron Flex-Seal Mud Line Valves were designed expressly for mud line service and, consequently, provide a number of mechanical features found in no other valve. For example, the hubs are attached to the valve body so that by simply loosening the four body bolts the hubs will swivel like a union when making up in a manifold. This feature alone saves many costly hours of rigging up time. The hubs may be fitted with threaded, flanged, welded-on or any special connection desired, thus permitting quick and easy interchange of valves in the manifold.

The most revolutionary feature of Cameron Flex-Seal Mud Line Valves is the renewable, resilient flow-way insert, for it is this feature that eliminates most of the maintenance required by conventional valves (based on results of competitive field tests). This flow-way insert absorbs the abrasive action of the drilling fluid, preventing damage to the valve body. It also provides a pressure-tight seat for the gate and seals the two-piece valve body. When worn out it may be replaced by any member of the drilling crew, quickly and at low cost.

Complete mechanical details on Cameron Flex-Seal Mud Line Valves are carried in your Composite Catalog or descriptive literature will gladly be sent on request.

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Significant initials

H F are two mighty significant initials to the war time refining industry

They stand for hydrogen fluoride, a remarkable chemical that is multiplying the possible production of 100-octane aviation gasoline

Hydrogen fluoride is the catalyst that economically combines isobutane not only with butylenes, but with propylene and pentylenes too, in the U. O. P. H F alkylation process—reactions long thought to be impossible

Hydrogen fluoride has been known to chemists for three quarters of a century but nobody in the oil industry recognized its importance until—

Universal research men, exploring the field of catalysis, discovered its exceptional power to react olefins with isoparaffins and invented the process to make the operation practical and efficient

Now it's a vital wartime process—more than a score of plants are building to operate the U. O. P. H F alkylation process It's available to all refiners

H F stands for heroic flyers, too—they are the boys who benefit the most from this Universal invention

OIL IS AMMUNITION—USE IT WISELY CARE FOR YOUR CAR FOR YOUR COUNTRY

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

THE REFINERS INSTITUTE OF PETROLEUM TECHNOLOGY

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production By States — Page 66

CRUDE PRODUCTION 3,996,445 bbl. daily average—up 21,360 bbl. One year ago 3,319,125.

CRUDE STOCKS 242,657,000 bbl. as of June 26—down 859,000 bbl. One year ago 253,364,000 bbl.

GASOLINE STOCKS 79,589,000 bbl. as of June 26—down 217,000 bbl. One year ago 88,461,000 bbl.

RESIDUAL FUEL-OIL STOCKS 67,960,000 bbl. as of June 26—up 505,000. One year ago 77,790,000 bbl.

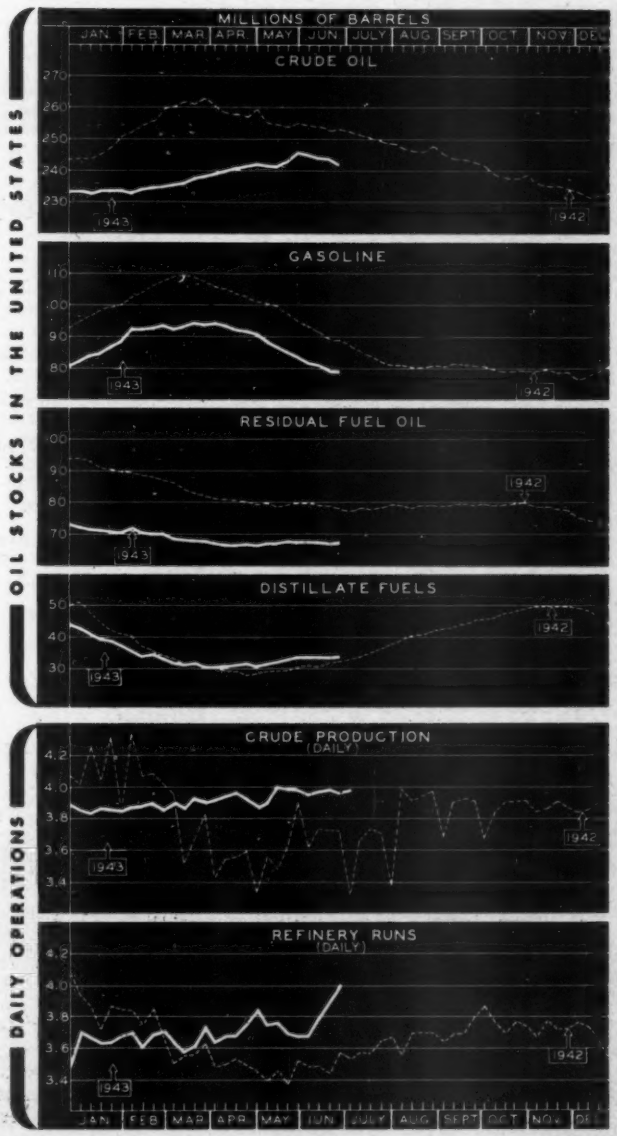
GAS OIL AND DISTILLATES 34,044,000 bbl. as of June 26—up 486,000. One year ago 32,206,000 bbl.

REFINERY RUNS 4,015,000 bbl. daily week ended June 26—up 110,000. One year ago 3,597,000 bbl.

REPORTS indicating that the Allied governments will change their oil program so as to increase supplies from the northern tier of South American countries and the refineries of the Netherlands West Indies were being studied the first of the week in relation to their probable effect on domestic operations. As explained in an article in this issue giving detailed data it would be possible to approximately double the present production of Colombia and Venezuela, including adjoining refineries in the Caribbean Sea, providing tanker movements to this country and to Europe can be increased. There has been no official statement that such a program would be made effective by war officials who for several months have insisted that the bulk of the oil requirements of the Allies must continue to come from this country due to its more favorable shipping situation. The assumption that this policy will change is based on the recent Allied success in coping with the submarine menace and the statements indicating a military demand of a million barrels of oil excluding aviation gasoline.

ECONOMISTS of the industry in analyzing the importance of the resumption of normal oil operations in South American countries are in agreement that it should ease the supply situation generally but if adopted it will not afford a complete answer to some of the immediate problems confronting the industry in this country. Due to the low gravity of most of the crude oil, the expansion in South American operations would furnish large quantities of residual fuel oils for expanding military demands. Improved shipping should also make more of the Mexican supply available. Production has been increasing but is 35 per cent under the early 1942 peak.

IT is pointed out that if the proposed increased supplies from other countries actually materialize they do not offer any solution to the shortage already apparent in this country. This is particularly true in the case of gasoline where the relationship between supply and demand as reflected in decreased stocks becomes increasingly critical. Crude runs to stills are being boosted at several points and crude oil is taken from storage where necessary to maintain these expanded operations but the combined military and civilian demands are running ahead of supplies. This situation will receive special consideration at the PIWC meeting next week in Washington with more severe gasoline rationing in prospect.



This prewar oil-shipping activity in Venezuela may be revived in the near future

Larger Market for Latin-American Oil Probable As U-Boat Victims Decrease

by I. P. O'Donnell

NEW YORK.—The imperative need for supplementing United States sources of oil supply, the existence of a substantial potential in Latin-American countries and a steadily improving tanker situation indicate that these countries, particularly Venezuela and Colombia, should witness an expansion of their export markets in the near future. Both have suffered from severely curtailed exports since the first of last year.

The desirability of increasing shipments from the Caribbean area was advanced by Dr. R. E. Wilson, president of Pan American Petroleum & Transport Co., and chairman of PIWC's economics committee, in an address before the Interstate Compact Commission's recent meeting in Pittsburgh, Pa. This belief was also embodied later in a resolution adopted by the commission. The resolution urged the supplementing of domestic sources of supply by "others," in order to forestall a need for producing domestic fields in excess of their maximum-efficient rates. Prospective demands for crude oil, according to Dr. Wilson, indicate that destructive production will be necessary if domestic supplies are not supplemented by "others."

Existence of an appreciable volume of Venezuelan and Colombian crude oil that is available for export is well known. Some appreciation of the extent of this potential supply may be obtained by a comparison of the daily average production of these countries for the first 4 months of this year with previous peaks. An additional significant fact is that the potential production of each country has increased since these peaks were established 16 to 18 months ago.

The accompanying table compares the daily average production of these countries this year with their pre-curtailment highs.

VENEZUELAN-COLOMBIA PRODUCTION

Month—	Venezuela	Colombia
January	408,030	6,727
February	352,220	11,936
March	413,540	15,215
April	412,485	11,679
4 months	396,046	11,540
Highs	*734,989	†83,428
Difference	338,943	71,888

*December 1941; †February 1942.

In the first 4 months of this year the two countries produced an average, combined, of 407,586 bbl. per day. This compared with their combined peak average (Venezuela's in December 1941 and Colombia's in February 1942) of 818,417 bbl. Their combined peak is 410,831 bbl. higher than their recent production.

This surplus could be augmented by the production of the Santa Barbara and Muri fields of Venezuelan Petroleum Co. (Sinclair) which is estimated potentially at 50,000 bbl. per day. A pipe line from Santa Barbara to a Caribbean terminal was completed a year ago so that this production is immediately available for export. In addition Standard Oil Co. of Venezuela planned this year to connect the Mulata field where 18 producing wells were completed in 1942 to its main pipe-line system. This system terminates at Caripito and therefore this production would not be immediately available for export via the Caribbean. However, the pipe-line connection will increase Venezuela's potential so that an over-all figure of 450,000 bbl. per day for the two countries is conservative. These figures do not take into consideration proven producing areas in both countries which do not yet have outlets such as Shell's Casabe field in Colombia.

With production available and the need for it established, the remaining and all-important consideration is the capacity and ability for transporting it. There has been a marked improvement in the tanker situation this year as a result of increased construction and decreased losses. The change has been so great that for the past 4 or 5 months new construction has exceeded losses. The effectiveness of anti-submarine measures is shown by the number of sinkings in the western Atlantic and Caribbean which in the 3 weeks ended June 26 totaled only two vessels, one in the Atlantic and one in the Caribbean. This is the best record since Germany undertook its all-out war on United States and al-

(Continued on Page 25)

THIS WEEK

TRANSPORTATION—Rail movement of oil to East Coast hits new record of 1,060,744 bbl. daily, exceeding highest previous peak by 63,179. . . . ¶WEP crude-oil extension will be completed next week, BUT deliveries must await filling of line, completion of pump stations and service lines to individual plants. . . . ¶Humble Oil & Refining Co. completes purchase of Atlas Oil & Refining Co. 6-in. from Shreveport, La., to Longview, Tex. . . . ¶Existing lines from West Texas operating at capacity, except one to San Antonio and one to Houston. . . .

NATURAL GAS—Hope Natural Gas Co. asks permission to build 1,140-mile, 22-in. line, from Hugoton field to Kanawha County, West Virginia. . . . Company cites imminent gas shortage, UNLESS eastern supplies are augmented by fall, 1944. . . . WPB will authorize at least one big transmission line to eastern area, but reserves judgment on which project will win approval. . . .

SUPPLIES—Inventory index on East Coast rises moderately. . . . Yet, stockpiling is impossible at present rates of delivery and at current calls by military forces. . . . ¶Full impact of big-inch completion will come in 45 to 60 days. . . . Then, tighter restrictions on civilians in Middle West, Rocky Mountains, Pacific Coast, may fall. . . . ¶Decreasing submarine victims intensify interest in Latin-American oil supplies, long subordinated by marine warfare. . . .

PRICES—Imminent adjournment of Congress blights hopes for legislative action to force higher crude prices. . . . Representatives of industry continue broadsides at OPA Chief Brown, work overhead with OWM Director Byrnes, Stabilization Director Vinson, without tangible results. . . .

RATIONING—WPB Chairman Nelson creates two committees, headed by PAW Ickes and OPA Chief Brown. . . . First determines available supply, certifies aggregate quota; second decides policies on allocation. . . . Both groups function with advice from ODT Director Eastman, with WPB's Nelson as umpire, in case of dispute. . . . ¶Heating-oil consumers urged to fill tanks, new coupon value set at 10 gal. . . .

EQUIPMENT—Redistribution program finally emerges, effective July 1. . . . Requires every operator to report excess inventory of supplies, BEFORE he can use preference ratings for critical requirements. . . . All new orders will be matched against list of excess materials. . . . Those with too much will be forced to sell to those with too little. . . .

ADMINISTRATION—Petroleum Reserve Corp. organized as subsidiary of Reconstruction Finance Corp. . . . Full scope of operations uncertain. . . . Charter provides for acquisition of reserves and supplies outside the United States. . . . Either directly, or through securities of operating companies. . . ¶Max Thornburg, former Standard Oil Co. of California executive, resigns as petroleum adviser to State Department. . . .

PRODUCTION—Completions rise rapidly in California, stimulated by higher prices modified drilling restrictions. . . . This year's wells may total 1,500. . . . Rate first 6 months twice that of first half last year. . . .¶Developments indicate small operators will be scarce in drilling deep, expensive wells to West Texas Ordovician. . . . Involves large capital investment, moderate long-term returns. . . .

REFINING—Another $13,500,000 war-plant contract executed, between Standard Oil Co. of California and Defense Plant Corp. . . . ¶Expanded facilities authorized at Abercrombie-Harrison plant on Gulf Coast. . . . First petroleum-toluene plant on East Coast starts production . . . . Canada reveals economics were chief factor in selecting petroleum, over alcohol, as basic material in synthetic-rubber program. . . .

Military transports, tractors and planes increased their tempo in the Solomon Islands again last week to invasion crescendo, probably repeating this scene at several points. This gives a hint of why military requirements for petroleum have been placed at 1,000,000 bbl. daily for the remainder of this year, with higher consumption in prospect for 1944

Official Photograph, U. S. Army Air Force

Government-Financed Foreign-Oil Operations, Objective of New Agency

by Henry D. Ralph

WASHINGTON, D. C. — Important plans for government-financed foreign-oil operations are believed to lie behind the matter-of-fact announcement by the Reconstruction Finance Corp. last week that it had chartered a new subsidiary to be known as the Petroleum Reserves Corp.

The charter states that the objects and purposes of the new corporation shall be "to buy or otherwise acquire reserves of crude petroleum from sources outside the United States, including the purchase or acquisition of stock in corporations owning such reserves or interests therein, and to store, transport, produce, process, manufacture, sell, market, and otherwise dispose of such crude petroleum and the products derived therefrom," and also "to construct and operate outside the United States such refineries, pipe lines, storage tanks and other facilities as are necessary in connection with carrying out the objects and purposes of the corporation."

The announcement stated that the Petroleum Reserves Corp. had been created "at the request of the secretary of commerce, with the approval of the president." Secretary of Commerce Jesse H. Jones is also chairman of the RFC.

It is understood that the Petroleum Administration for War, which has a large foreign division actively concerned with foreign sources of oil supply for the United Nations, did not request formation of the new corporation and was not officially informed of the plan in advance.

In a brief announcement of the charter, Secretary Jones said: "While no definite plans have been formulated, consideration is being given to one or two projects that may be of value in the war effort. The objective is to look ahead, in the unfortunate event of a prolonged war."

Officials of the RFC said they were unable to give any hint of the "one or two" projects now under consideration, or to throw any additional light on the origin of the new corporation or its possible methods of operation.

The general assumption is that the impetus for the new corporation came from either the Army or the Navy, or both. On several recent occasions high officials of both Army and Navy have expressed public concern over the possible shortage of petroleum reserves for military requirements, and over the long hauls necessary to get petroleum products from this country to the theaters of operations.

There is a distinct possibility, though not confirmed officially, that the Petroleum Reserves Corp. may work in cooperation with the new Fuel and Lubricants Division now being activated by the Army Service Forces under Col. W. E. R. Covell, who last week was nominated to be a brigadier general. This division not only incorporates all the procurement activities of several branches of the Army which formerly operated independently, but it is expanding its top personnel and is bringing in men whose experience in the oil business goes far beyond that needed for mere purchase of petroleum products. One of the functions of an invading army of any country would be to develop sources of supply of petroleum and other requirements in occupied territories, and the Fuel and Lubricants Division logically would be expected to be prepared to handle such work in cooperation with the Army Engineer Corps if, as and when the U. S. Army occupies oil-producing areas now held by the enemy, whether Albania, Rumania, Burma, Netherlands East Indies, or elsewhere. It might be that the Army would find it more convenient to have at least part of this work handled by a civil corporation such as the Petroleum Reserves Corp.

Another possible use for the PRC might be to use government funds to explore and develop foreign oil holdings of United States oil companies which do not give promise of immediate large yields without the investment of more capital than private interests care to risk, particularly if postwar markets in the area are not assured.

From a recent remark of Secretary of the Navy Frank Knox it might be inferred that the Government is negotiating with some foreign governments, perhaps in South America, for oil development with U. S. Government capital. It is also possible that the new corporation might take over completion of the drilling, pipe-line and refinery project at Fort Norman and Whitehorse, Canada, which the U. S. Army now has under way.

Material Redistribution Program Emerges After 90-Day Delay

WASHINGTON, D. C.—A new program for utilizing excess inventories in the oil industry will be promulgated by the Petroleum Administration for War within a few days, according to present plans, and will be retroactive to July 1.

It will be known as Materials Redistribution Program 2, and has been more than 3 months in the drafting. It will apply to every operator in every branch of the oil industry except small marketers, and after the effective date every operator must certify membership in the plan before he can obtain any priority assistance in getting new materials. Participation involves filing an inventory, on a prescribed form, of all "excess" quantities of critical materials owned, divided into tubular goods, copper products and valves, and other fabricated materials. Excess inventories are defined as more than 90 days' supply of small items, more than one-half the quantity used in 1942 of copper products and valves, and big items not used during the past 120 to 180 days, depending on the category.

These report forms will be filed with the PAW district offices, and

persons seeking priorities to obtain new materials will be referred to sources of excess inventories. Such items will be acquired by private negotiation, under ceiling prices set by the Office of Price Administration. A priority application so referred will be considered filled and void within 15 days unless the applicant files a reason why he was not able to acquire or use the material in the inventory of another company.

Priority orders P-98-B and P-98-C will be amended to conform to the new definition of excess inventories. One effect of the new plan will be to remove the oil industry from programs for distribution of surplus materials recently promulgated by the WPB for other industries.

Mexican Production Rising

REVIVAL of Mexican crude-oil production continued through April when the output of properties under management of Petroleos Mexicanos, the national company, averaged 88,465 bbl. daily. Since October 1942, when Pemex production reached a low point of 67,820 bbl. daily, the rise in output to April has been a net gain of 30 per cent.

During the first 4 months of this year, Pemex production totaled 9,873,499 bbl., a daily average of 82,279, compared with output aggregating 8,530,806 bbl. in the last 4 months of 1942, an average of 69,925 bbl. daily. Current output compares to an average of about 118,000 bbl. daily during the first 4 months of 1942.

Current production from the Poza Rica field, the most prolific area under Pemex management, averages around 57,500 bbl. daily. When the low mark of 67,820 bbl. daily for all Pemex production was reached last October, the Poza Rica field was yielding about 48,900 bbl. daily, indicating the importance of this field in the general level of Mexican petroleum operations.

The production figures reported by Petroleos Mexicanos do no include statistics on operations of independent companies still active in that Central American country. Normally, the independents account for about 4,000 to 4,500 bbl. daily which, added to Pemex output in April, would increase the over-all yield during that month to around 93,000 bbl. daily.

PETROLEOS MEXICANOS PRODUCTION
(Figures in barrels daily)

	1943	1942
January	74,609	136,843
February	77,839	138,530
March	87,973	104,566
April	88,465	90,091
May	.....	98,905
June	.....	104,151
July	.....	90,079
August	.....	77,410
September	.....	71,038
October	.....	67,820
November	.....	69,655
December	.....	71,213

British Bombers Burn 2 Gal. of Fuel Per Mile

LONDON, Eng. — Lancasters, the blockbuster-carrying bombers, each consume about 2,000 gal. of gasoline in flying 500 miles to the Ruhr and back to British bases, it was disclosed here last week by Geoffrey Lloyd, chairman of the oil control board. A big bomber raid costs about $800,000 for fuel alone, he said, at this consumption rate of 2 gal. a mile.

California Field Discoveries Are Offered Bonus Oil

LOS ANGELES, Calif.—An inducement to California oil operators to engage in exploratory drilling has been announced. The production committee for District 5 is offering a bonus allowable to any well successfully completed and discovering a new oil pool. The announcement was made by E. E. Pyles, chairman of the production committee, in a letter to all California oil producers.

Allocation to discovery wells increases progressively with increasing depth. The committee has prescribed both the total barrels to be allocated, as well as the daily rate of production. Wells drilled to a depth of 2,000 ft. are given a total allocation of 30,000 bbl., to be produced at a daily rate of 325 bbl., while wells of 10,000-ft. depth receive 150,000 bbl., to be produced at a daily rate of 525 bbl. The scale is graduated for intermediate and other depths.

The ruling applies to any new discoveries completed subsequent to May 1, 1943. Limiting conditions under which discovery wells may participate in the bonus are set forth. Certification of any such wells to determine that they have made a discovery is necessary. Production at the bonus rate is not extended to wells with extremely high gas-oil ratios nor where the natural gas produced with the crude oil cannot be utilized. Also production may not be greater than the volume which can be transported and marketed. Completion of an offset well located in the same pool within 1,320 ft. of the discovery well will terminate the bonus allotment to the discovery well.

Rail Movement East Sets All-Time Peak of 1,060,744 Bbl.

WASHINGTON, D. C.—Eastward rail movement of petroleum and petroleum products reached a total of 1,060,744 bbl. per day for the week ended June 26, according to the Petroleum Administration for War. This figure is 90,209 bbl. per day over the previous week, and 63,179 bbl. over the previous all-time record.

This total is a revision of the shipments given in the weekly East Coast Petroleum Bulletin distributed earlier in the week, and includes figures on substantial shipments by box cars. The movement embraced handling of 32,218 tank cars and more than 2,000 box cars.

Oklahoma Defers Action On Allowable Bonus

OKLAHOMA CITY, Okla. — The Corporation Commission, at its meeting last week, deferred action on the new bonus allowable for wildcat wells. Purpose of the new allowable, based on the depth drilled, was to encourage wildcatting in the state. However, only one discovery allowable would be granted for each separate geologic structure, with a minimum of 5,000 bbl. to be granted regardless of depth. Following is the proposed scale:

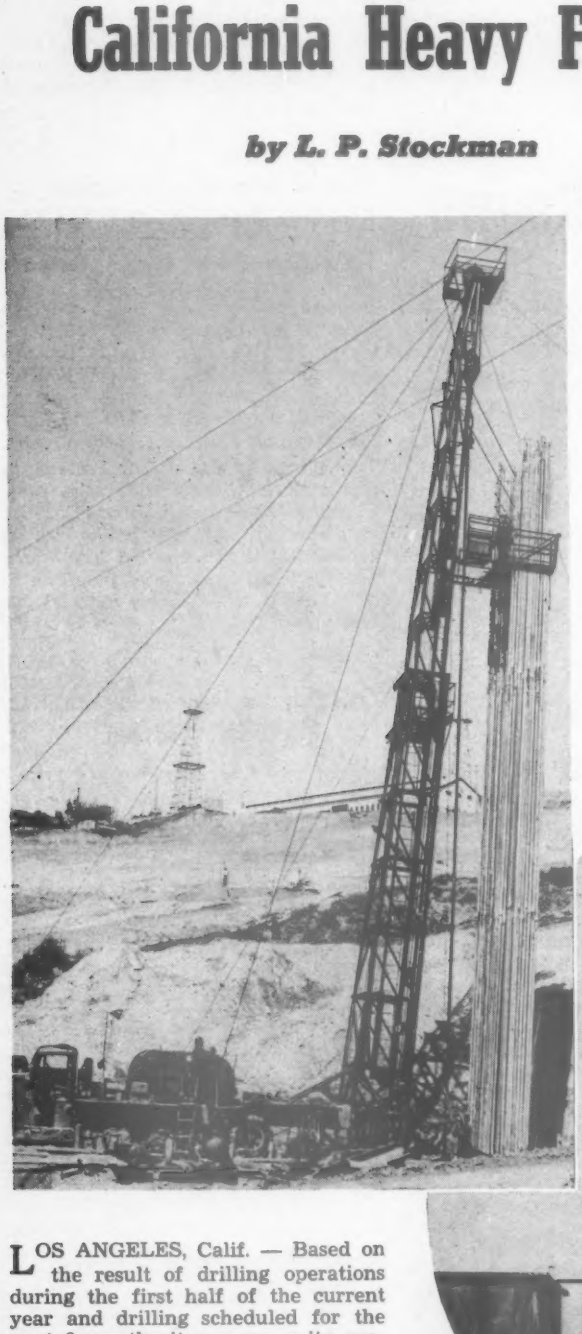
Depth—	Allowable per bbl.-ft.
0-3,000 ft.	3.0
3,000-4,500 ft.	4.5
4,500-6,000 ft.	6.0
6,000-7,500 ft.	7.5
Below 7,000 ft.	10.0

Sohio Purchases Interests Of Nate Appleman

Nate Appleman, independent producer of Wichita, Kans., has contracted to sell his family interest in producing properties in Kansas, with a daily net production of 2,400 bbl. per day to Sohio Oil Corp., Cleveland, Ohio. The consideration is said to range between $2,000,000 and $2,500,000. The sale includes 175 wells in Russell, Rice, Ellsworth, Graham, McPherson and Barton counties.

Completions Rise Sharply in California Heavy Fields

by L. P. Stockman



Left: Portable clean-out rig working on location in the Ventura Avenue field, showing nearly 10,000 ft. of 3-in. tubing stacked in the derrick

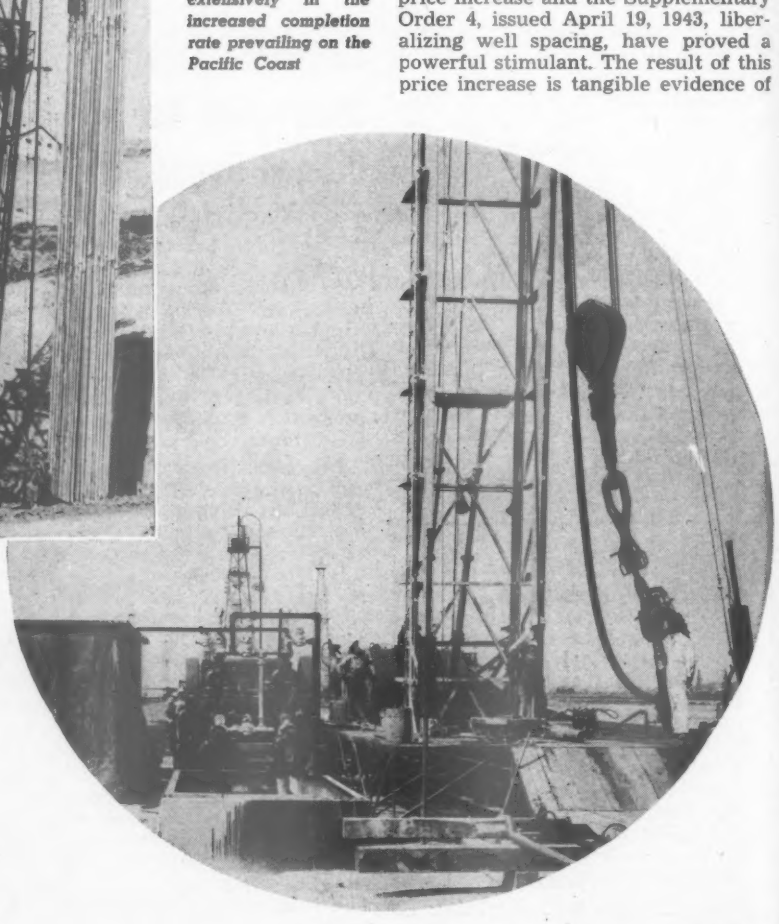
Below: Compactness is a dominant factor in portable drilling rigs now used extensively in the increased completion rate prevailing on the Pacific Coast

LOS ANGELES, Calif. — Based on the result of drilling operations during the first half of the current year and drilling scheduled for the next 6 months it appears quite possible that a total of 1,500 new holes will be drilled during 1943. This estimate may appear high but it is based on expectations that sufficient material will be made available and that operators will be able to secure deferments on men vitally needed to fulfill the drilling program. There is at present a shortage of necessary materials, but the California office of PAW is making preparations to overcome deficiencies as quickly as possible.

Although the total number of new wells to be drilled during 1943 will be higher than the average in the past, the total footage drilled will be smaller as much of this projected development will be in fields where pays are from 1,000 to 3,000 ft. During the years when Rio Bravo, Greeley, Coles Levee, Kettleman North Dome and other deep fields were drilled the total footage was high and required considerable pipe. A large part of the heavy equipment for deep drilling has been stored and portable units are now being used in increasing numbers. Additional units could be used, but critical shortages of material have reduced the number that can be produced. There are about 28 portable units currently in use in California. This type of equipment is especially suitable for drilling in the shallow or so-called post-hole fields where, in many cases, wells produce from 500 to 1,000 ft.

Drilling Rate Doubled

Drilling operations in California during the first 6 months of 1943 are almost double the amount of drilling undertaken during the first half of last year which indicates that the price increase and the Supplementary Order 4, issued April 19, 1943, liberalizing well spacing, have proved a powerful stimulant. The result of this price increase is tangible evidence of



what can be expected if the Patman resolution or Disney bill, now in the House committee on banking and currency, is approved and put into operation.

A large part of current drilling in shallow San Joaquin Valley fields is being done with portable equipment. For the most part these units are completely unitized and portable either as a single unit or with trailer arrangement. A considerable number of wells have been drilled with this type of equipment and for the most part no derricks are erected after completion.

In the South Belridge field where production is developed from 700 to 1,300 ft., wells are completed in about a week, but of this time only about 4 days are employed in actual drilling. In order to keep these portable units in actual operation it is customary for operators to stake several locations ahead and have foundations in when the drilling unit arrives. One operator follows the practice of drilling several wells to the pay and then coming back after cementing and completing the wells in rapid succession.

Other fields reflecting increased drilling include Midway-Sunset, Elk Hills, Round Mountain, Newhall Potrero, Brea Olinda and Huntington Beach with some other fields showing increased production from various other sources.

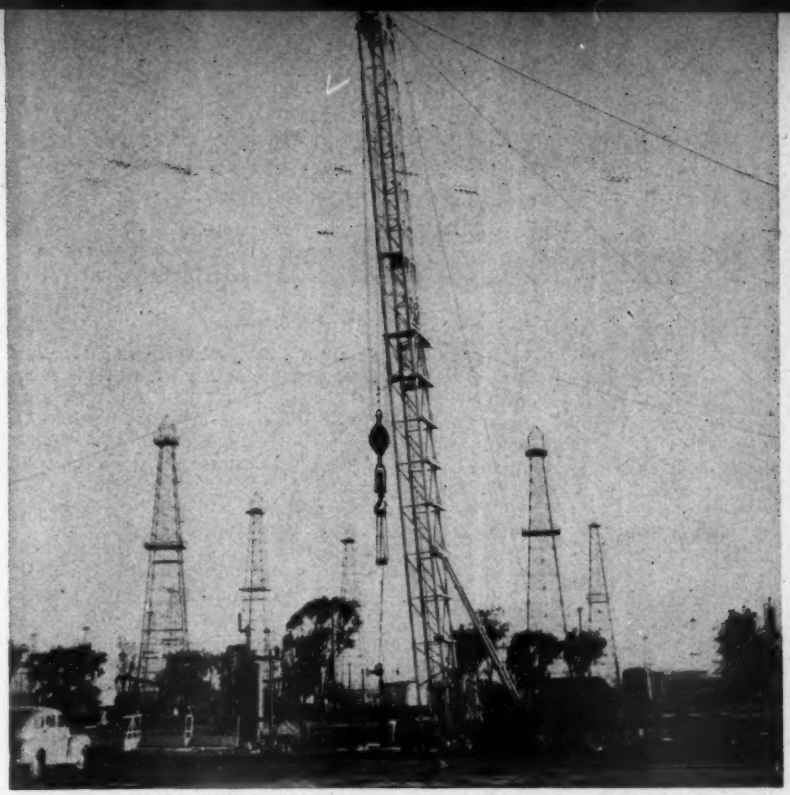
In deep fields and especially in areas with high gas pressures, conventional drilling equipment is used.

Development Wells Favored

A large part of the development work under way in California at the present time consists of drilling undeveloped acreage in the older fields. Outstanding in the list of these fields are Buena Vista Hills, Coalinga East and West, Midway-Sunset, Mount Poso, Round Mountain, Santa Maria Valley, Huntington Beach, Torrance, Elk Hills, Ventura Avenue, Newhall Potrero, East and West Coyote and Montebello. Wildcat exploration has not been especially successful and consequently operators have returned to the older fields as a war measure.

At Pleasant Valley Standard Oil Co. of California and R. S. Lytle each will have several additional wells to drill this year.

The Navy Department has an ambitious program outlined for Elk Hills and will probably proceed with this drilling program notwithstanding the recent cancellation of the Standard-Navy contract. Approximately 35 new wells are expected to be drilled at Elk Hills. There is much extension work to be done and some sections that have been overproduced require a rest to allow the reservoir to establish an equilibrium. Standard of California proved Miocene production over a year ago and this, even though the sand is fairly tight, indicates the existence of a large reserve at Elk Hills.



Moving and rigging-up time is reduced to a minimum in current operating practice in California where maintenance of current production is essential

Standard of California is carrying out an aggressive development program involving many fields, and, according to H. D. Collier, president, the company will drill 365 new wells during 1943. This is an average of one a day and obviously will require the services of several drilling contractors to supplement the company's own crews. Other companies are also pursuing an aggressive development program but will not individually drill as many new wells as has been anticipated as there is a tendency to retard development of the so-called tar zone in that field until a later date. The original program called for 80 wells. The tar sand is estimated to contain a crude-oil reserve of approximately 50,000,000 bbl., a large part of which could be made available for use during the next several years.

The result of increased drilling in California fields is reflected in the production of several fields. South Belridge, where numerous shallow wells have been drilled during the past several months, is now producing more oil than North Belridge with its Temblor and Eocene pays. Current production of South Belridge is about 6,250 bbl. daily as compared with 2,200 bbl. per day at the same time last year. Production of the East Coalinga fields has been stepped up 5,000 bbl. daily in a year and the Kern Front district is now producing 11,650 bbl. daily as compared with 6,570 bbl. per day last year.

California crude-oil production appears to have definitely reached its current peak because of application of the maximum-efficient-rate factor, and the necessity of reducing high gas-oil ratio wells in order to eliminate gas waste. The m.e.r. factor establishes the maximum allowable at which a well can be produced without damage to the reservoir. Gas demand reaches its lowest point during the summer months and hence it is necessary to shut in high gas-oil ratio wells. When gas production is reduced, oil production is likewise reduced and this automatically reduces the amount of crude oil the state can produce. The seriousness of the production situation has been apparent to California operators for more than 2 years. The situation has reached the point where there is serious doubt whether current gasoline-rationing standards can be maintained.

The prime need in California at present is the discovery of several new fields as crude reserves have been consistently reduced for several years. At least 200,000,000 bbl. of new production annually is required to balance supply and demand and under present abnormal demand the requirement is nearer 250,000,000 bbl.

A survey of conditions in California reveals that the price adjustment earlier this year and the more liberal well-spacing program as outlined in Supplementary Order 4, have stimulated drilling operations in California. A still higher price for crude, operators assert, would stimulate wildcat exploration as there would be inducement to justify extensive prospecting.

Reeser to Retire As Barnsdall President, J. A. Dunn Successor

E. B. REESER, for many years an outstanding leader of the petroleum industry, at the close of this month will retire as president of Barnsdall Oil Co. This action is in accordance with the company's retirement policy. As a large stockholder in the company he will continue as a director and a member of the executive committee.

James A. Dunn, who has been connected with the Barnsdall interests for the past 35 years and who has been serving the company as vice president and secretary, will succeed Mr. Reeser as president. He will continue to make his headquarters in New York City. Frank Braman, who has been assistant secretary of the company, will succeed Mr. Dunn as secretary. No other changes in the executive personnel have been announced. D. R. Snow is vice president and general manager of the company in charge of the Tulsa headquarters. William Dewey Loucks will continue active in the management of the company as chairman of the board with offices in New York City. William C. Whaley, vice president, Los Angeles, is in direct charge of the California operations of the company.

Mr. Reeser's plans for retirement came as a surprise to many of his friends throughout the industry who did not realize that on his seventieth birthday, July 15, he will have had more than 50 years of activity in petroleum operations with nearly 40 years of this total with the Barnsdall interests. He was born in New Ringgold, Pa., in 1873 and when 18 years old he went to work for Standard Oil Co. at Oil City, Pa. Two years later he was in charge of the gas division of the company's operations in the Sistersville, West Virginia, area.

After 9 years, he left the Standard company to go into the oil business for himself. He became associated with T. N. Barnsdall, founder of the Barnsdall company, in 1904 when Barnsdall acquired the properties in which Mr. Reeser was interested. He served the Barnsdall interests in various capacities and in 1925 became the president of the company. The company was engaged in all branches of oil operations for many years but recently has largely confined its activities to crude-oil production and is now one of the most successful of the producing companies.

Leader in Conservation

Over the past two decades, Mr. Reeser has been a leader in matters of importance to the entire petroleum industry. He was a pioneer in oil-conservation efforts and received national recognition starting in 1926. As chairman of the advisory conservation committee of the Mid-Continent Oil and Gas Association, he was the actual head in the conservation and proration programs which kept the industry from being flooded with excess crude oil from the Seminole and Oklahoma City fields.

Largely because of his leadership in these efforts he was elected president of the American Petroleum Institute in the fall of 1928. He held this position as the last of the unpaid presidents of the Institute for three terms. His terms as A.P.I. president were marked with active participation in oil problems within and outside this country.

Mr. Reeser's interest in the oil industry's affairs did not end with his retirement as president of the Institute. He was a member of the oil industry's NRA committee in 1933-35 and he has been an active member of the Petroleum Industry War Council since its organization in 1941.

E. B. REESER

J. A. DUNN

Minimum Refinery Wage of 40 Cents an Hour Proposed

WASHINGTON, D. C.—A proposal that a minimum wage of 40 cents per hour be paid in the petroleum refining industry is the subject of a hearing scheduled for July 15 by the Wage and Hour Division of the Department of Labor at 165 West Forty-sixth Street, New York.

This minimum wage was recommended by an industry committee appointed by the division for the chemical, petroleum and coal products, and allied manufacturing industries. It applies to the manufacture or packaging of basic chemicals, chemical products, and products made from petroleum, coal or natural gases, including petroleum refining. Copies of the committee's report may be examined at district offices of the Wage and Hour Division. Persons desiring to appear at the hearing must file notice with the administrator in New York by July 12.

Eleven Ocean Tankers Are Completed in June

WASHINGTON, D. C.—Eleven Maritime Commission sea-going tankers and three coastal types were included in the June production of the nation's shipyards which turned out a total of 168 cargo vessels, it was disclosed here last week. Fifteen tankers were completed in May.

Five of the new ocean tankers were launched by Sun Shipbuilding & Dry Dock Co., Chester, Pa.; four were completed by Kaiser Co., Inc., Portland, Ore.; one by the Marinship Corp., Sausalito, Calif., and one by the Alabama Dry Dock & Shipbuilding Co., Mobile, Ala. All three coastal tankers were built by Barnes-Duluth Shipbuilding Co., Duluth, Minn.

During the first 6 months, the country's shipyards built 879 cargo ships aggregating 8,818,622 deadweight tons compared to 746 vessels totaling 8,089,732 tons for the entire year of 1942.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

A Military Opportunity

THE formation of the War Department's new Fuel and Lubricants Division and other reorganization plans to bring about a closer coordination between the Army and Navy and the oil industry can be a development of major importance.

The hearings and the statements at Washington which preceded the adoption of the program have given this country its first official but still incomplete information as to the essential part that petroleum has played in the Allied military successes so far with partial data as to what will be required in oil over the remainder of this year and later.

A great deal has been said in recent weeks as to what it took in ships, airplanes, tanks, trucks and other supplies and equipment to win the North African offensive. Little has been said about the oil that got them there and kept them in action until the enemy was defeated.

No one has ever explained how the storage and the distributing facilities already in Africa made possible the landing of the United States-British armada and how the private owners, working with the military, quickly expanded their operations to support the continuous engagement with the enemy.

These and hundreds of other oil accomplishments have not been part of the war news either because oil supplies are always assumed to be where they are wanted or because of secrecy restrictions as regards petroleum activities.

It is inconceivable that military leaders don't now know that the armed forces "travel on their oil" from the time training starts until the general and his staff arrive in their armored cars and jeeps to accept the surrender of the conquered.

They also must realize that this taken-for-granted attitude regarding oil availability must end. They, better than anyone else, know what and where the demands of a many-front offensive will be. Also they have or can readily obtain the information on the diminishing supplies of this industry restricted by war controls which will result in serious shortages unless a realistic operating plan, based on needs, is adopted.

What can the military do? It can do the same as was done at the start of the war and before in the case of munitions, ships, airplanes and motorized equipment. There has been no quibbling about price, materials and manpower in these production programs.

The Army and Navy explained what they had to have in these war essentials and civilian officials are constantly pointing with pride that they are meeting these requirements on schedule due to the all-out activities of producers of raw materials and thousands of manufacturing plants.

Yet petroleum, which represents approximately two-thirds of all the overseas war shipments and without which the remaining one-third would be useless at the war fronts, still has to contend with civilian policies designed for the production of peanuts or the sale of men's haberdashery. After 19 months of circumscribed operations at prewar returns, this great natural-resource industry dependent for its existence on the hazardous activity of exploring and drilling for oil, is now vulnerable in its future support of the war.

The military can end this if it will. This country should know shortly whether those directing the war from the nation's capital have the courage of those who are carrying the war to the enemy.

Big-Inch Completion Due July 16

by Paul Reed

THE big-inch line will be completed July 16 for War Emergency Pipelines, Inc., providing a continuous 24-in. crude-oil line from Longview, Tex., to the New York and Philadelphia refining centers. Arrangements are being made for a ceremony at which the final weld will be made near the Phoenixville junction of the system, about 12 miles east of Phoenixville, Pa., and approximately 35 miles northwest of Philadelphia.

The WEP 20-in. refined products line is to be completed into Norris City, Ill., on September 1 and into the New York City area before December 1.

Crude oil will be pumped east through the 24-in. line from the Norris City, Ill., terminal of the line as soon as construction has been carried to a point which would justify this step. No preliminary water pressure tests will be conducted in advance of the oil stream. Because of the demands of eastern refineries for a continuous supply of crude only 100,000 bbl. of crude will be diverted daily for filling the eastward extension of the line. During the 3 or 4 weeks required to fill the line at the rate of 100,000 bbl. daily, tank-car shipments will continue from Norris City.

One Station Idle

Throughput of the WEP line has not exceeded 276,000 bbl. daily since the pump station at Gale, Ill., was flooded in the latter part of May. From a high level of 16 ft. water had subsided at the beginning of this week to a depth of 2 ft., and it is believed that within a few days the station will be dry and equipment will be put in operating condition. The line has been rated at a minimum capacity of 325,000 bbl. daily.

Record movements of 337,008 bbl. were made from the Norris City terminal on July 3, consisting of 249,368 bbl., shipped direct by tank cars and 87,640 bbl. sent via Enfield, Ill., through the Ohio Pipe Line Co. system to several loading racks.

To complete the big-inch, only short stretches in the Wabash River bottoms in Illinois, at a location east of Greensburg, Ind., and two short sections in Pennsylvania, remain to be finished. Of the 731 miles of 24-in. line for the eastern extension, an even 700 miles had been completed early this week; 128½ miles of 20-in. has been laid for two branches east of Phoenixville. All of the pipe has been laid in the Philadelphia area. Station construction is well advanced.

For the 20-in. products line, frequently referred to as the "little big-inch," work is now in progress all the way from Texas to Pennsylvania. So far, 274 miles of 20-in. and 65 miles of pipe of various smaller sizes for feeders in the Beaumont and Houston, Tex., areas have been laid.

J. W. Williams, vice president of WEP, recently has been serving as manager of operations under B. E. Hull, vice president and general manager, and Maj. A. N. Horne, vice president and assistant general manager. Mr. Williams has been loaned to WEP by the Atlantic and Keystone pipe-line organizations.

Personnel Changes

P. T. Thibodaux, formerly operating superintendent of Arkansas Pipe Line Corp., has become assistant general superintendent under Oscar R. Burden, general superintendent of WEP. H. B. Hensley, formerly of Humble Pipe Line Co., has been transferred from construction work on WEP to become superintendent of the Norris City division. Hugh W. Lambert has been assigned to the position of assistant superintendent of the important New Jersey division. W. G. Heltzel, vice president, Stanolind Pipe Line Co., who has been supervising design and construction of eastern terminals for WEP, is to return to the Stanolind organization which is preparing to build the West Texas-Oklahoma 16-in. crude-oil line. P. W. Houghtlin is personnel manager of WEP, succeeding P. L. Pearson who died early in June.

Three grades of crude oil are to be segregated for shipment through the WEP 24-in. These consist of West Texas, Corpus Christie-Refugio and East Texas. Already several batches of 400,000 to 500,000 bbl. of West Texas crude have been pumped to the Norris City terminal. Up to this time, some Gulf Coast light crudes have been shipped through the WEP line mixed with East Texas oil. But Gulf Coast light crude has only been available in limited amounts and it is not anticipated that there will be further shipments of this type oil through the big-inch.

Enough No. 2 heating oil for a batch shipment has been in storage at the WEP Longview, Tex., terminal since it was brought there by pipe line this spring. According to present plans, it appears that this heating oil will be pumped to Norris City as soon as the 20-in. products line is completed to that point in September.

Plenty of crude oil seems to be in sight for making the utmost use of the WEP 24-in. pipe line. However, empty tank cars have been arriving irregularly at Norris City, at a rate averaging only 900 cars daily. More are required to move scheduled shipments. Railroad facilities are adequate. No delays have been reported which could be attributed to the fact that trains move in and out of the Norris City terminal on a single-track road.

Preparations are being made to lay pipe across the Mississippi River soon. Barge equipment has been moved to Little Rock, Ark., to repair broken sections in the Arkansas River. Dredging will be carried on to lower all of the pipe there to the lowest point in the river crossing.

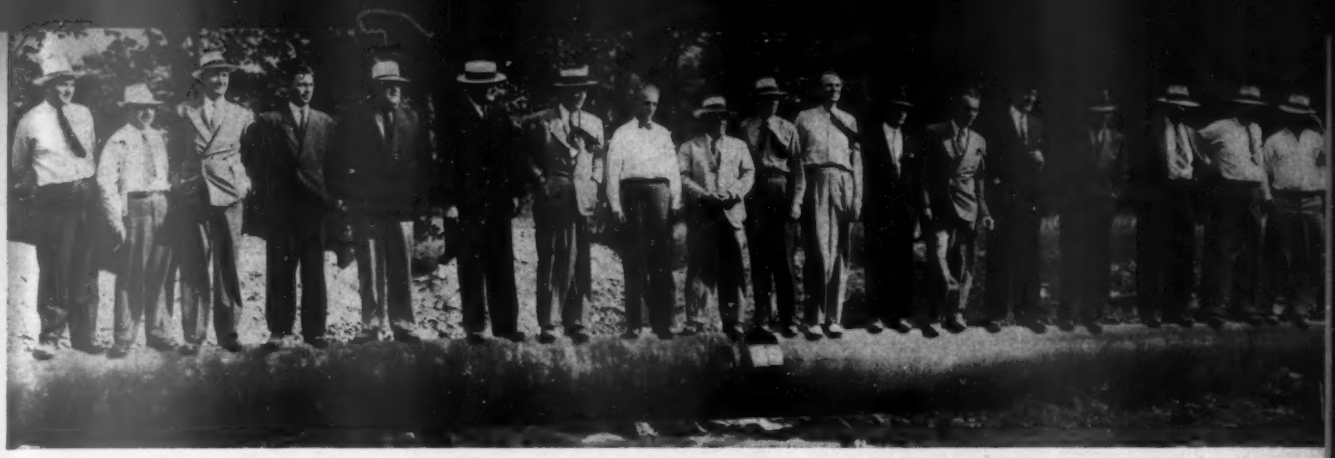
Cole Pipe-Line Act Given 2-Year Extension

WASHINGTON, D. C. — A bill extending the Cole pipe-line law 2 years this week rested on the president's desk awaiting final approval. Action on the legislation was completed in the Senate last week extending the act, which was originally sponsored by William P. Cole, Jr., of Maryland, until June 30, 1945.

The act permits the president to proclaim that construction of pipe lines is essential to the national interest, and where construction is impeded by inability to obtain rights-of-way or easements, he can delegate a government agency to exercise the right of eminent domain to condemn the necessary property.

Before the bill passed the Senate, Senators Clark of Missouri and Pepper of Florida criticized Petroleum Administrator Ickes and his organization.

Senator Pepper, advocate of a trans-Florida barge canal to move oil, said he wanted to be sure the bill didn't make Mr. Ickes a pipe-line czar. He charged that the petroleum administrator had been "intellectually dishonest" in withholding information from Congress about alternate methods of moving oil to the East.



Officials inspect the big-inch at the foot of Buffalo Mountain. They are: Denver Patton, district superintendent, WEP; Mr. Vanore, DPC representative; unidentified; George H. Hill, Jr., executive vice president, DSC; Dave Williams, Williams Brothers Corp.; W. Alton Jones, president, WEP; B. I. Graves, executive vice president, Tide Water Associated Oil Co. and a director of WEP; D. F. Leary, assistant secretary, WEP; Burt E. Hull, vice president and general manager, WEP; George Brigance, district superintendent, WEP; Maj. J. R. Parten, director of transportation, PAW; Frank W. Abrams, director, Standard Oil Co. (New Jersey); J. Howard Marshall, general counsel, PAW; C. H. Hathaway, Gulf Oil Corp.; Alexander Fraser, president, Shell Oil Co., Inc.; Earl Hackleman, general manager, O. C. Whitaker Co.; Oscar Burden, general superintendent, WEP, and Charles Ice, spread superintendent, O. C. Whitaker Co.

WEP On Last Lap

Looking through the end of a joint of the big-inch toward the cleared right-of-way ascending Buffalo Mountain in western Pennsylvania

Ready for the pull across the Delaware, separating Pennsylvania and New Jersey

Lowering pipe into a trench in the Pennsylvania mountains

Setting charges in shot holes at the Delaware crossing

Major Gas Line From Southwest to Eastern Area Practically Assured

WASHINGTON, D. C.—A serious shortage of natural gas in the Appalachian area is threatened by next year, in the opinion of the War Production Board, and its Office of War Utilities probably will recommend the construction of a large pipe line from somewhere in the Southwest next summer.

This situation was revealed when the Federal Power Commission announced it had received an application from the Hope Natural Gas Co. of Clarksburg, W. Va., for a certificate of public convenience and necessity to construct a 22-in. natural gas pipe line from the Hugoton field in Kansas to Kanawha County, West Virginia, a distance of 1,140 miles. (See p. 58 for details of the application.)

It is understood that the Hope company is filing a similar application with the Office of War Utilities, and that the Tennessee Gas & Transmission Co. also has an application before OWU for a pipe line from Texas or Louisiana to the Appalachian area. Other companies are also believed to be interested in similar projects.

The present plan of OWU is to make a further study of the threatened shortage and of whatever pipeline projects may be filed with it until some time this winter. It will then recommend to the Federal Power Commission that a new line be built from somewhere in the Southwest and will signify its readiness to secure allocation of construction materials in time to have the line in service during the winter of 1944-45. The FPC will then have the duty of deciding the best source of gas and which of the pending projects should be approved. It probably will be stipulated that the gas be made available to other companies for the duration of the war.

Committees to Clarify Rationing Policy

WASHINGTON, D. C.—The promised plan for coordinating rationed demand with available petroleum supplies announced late last week by Donald M. Nelson, chairman of the War Production Board, denies control of rationing to Petroleum Administrator Harold L. Ickes but gives PAW a much closer check on the operations of the system.

Mr. Nelson announced that the agencies concerned had agreed on the arrangement and the over-all policy for handling petroleum supply and distribution problems.

Two interagency committees are created, and the members of either may appeal to the WPB chairman in case of disagreement. A Petroleum Rationing Policy Committee will be composed of representatives of PAW, Office of Price Administration, WPB, Office of Defense Transportation, and War Food Administration, with the price administrator as chairman,. A Petroleum Requirements Committee, with the petroleum administrator as chairman, will include representatives of PAW, OPA, ODT, WPB, and other principal agencies having substantial claims for petroleum.

In explaining the new plan the WPB said:

"Maintenance of petroleum supply and its distribution down to and including the retail outlet will continue to be the responsibility of the Petroleum Administrator for War. Quotas for the various rationed areas are to follow the pattern of rationed demand as shown by returned used coupons.

"Available petroleum supplies of rationed petroleum products where shortages exist are to be divided by the petroleum administrator after consultation with a Petroleum Requirements Committee.

"In addition to ODT's transportation responsibilities and its functions of presenting to PAW estimates of petroleum requirements for all classes of transportation, that agency will determine the distribution of petroleum products among the various classes of transport, including passenger cars, within the total amount allotted for this purpose by PAW. The present arrangement by which ODT certifies to OPA the amount of gasoline to be rationed to each operator of commercial vehicles will also continue. The certifications are binding upon OPA, unless the total gallonage thus certified is in excess of the quota for this purpose.

"The War Production Board will determine the relative essentiality and priority of the various competing industrial and civilian uses for all petroleum products, including gasoline. OPA is to notify WPB if it believes any such determinations to be impractical from an operating or administrative standpoint.

"The agreement sets forth clear lines of responsibility for the operations of each agency concerned and provides two channels for complete review of petroleum allocation and rationing policies, the Petroleum Requirements Committee and the Petroleum Rationing Policy Committee.

"This will result in efficient utilization of available petroleum supplies and provide a constant fluidity of operation to meet changing conditions."

Book Gives Past, Present And Future of Oklahoma Oil

"Oil and Gas in Oklahoma" is the title of a 68-page booklet which has just been published by the Kansas-Oklahoma division of the Mid-Continent Oil and Gas Association, the Oklahoma Stripper Well Association, and members of the Independent Petroleum Association of America, in Oklahoma. One half of the booklet is devoted to the historical development of the oil industry in the state, and how this is interwoven into the economic growth. One chapter delves into the oil future of the state. The other half of booklet is devoted entirely to statistics, presented in tables, covering everything from taxes to refinery data.

Ickes Explains Oil Situation in New Book

"Fightin' Oil" is the title of a new book by Harold L. Ickes, petroleum administrator for war. According to a statement on the jacket, that is "the inside story of the relationship between our petroleum supply and the state of global war told by the man charged with the responsibility of delivering oil on time to the battle lines and the home front." In it, the author writes with surprising freedom concerning the country's status as the leading oil producer of the world and its probable future. He also reveals something of the enemy's position with respect to oil. Naturally, he devotes considerable of the account to a description of the PAW and how it has functioned, but he gracefully gives abundant credit to the cooperation of the oil industry in the achievements to date. A general reading of this book by the public would go far to reduce the criticism that has been leveled at gasoline rationing, and to bring about a better understanding of the causes of present shortages. The book is published by Alfred A. Knopf.

Larger Market for Latin-American Oil

(Continued from Page 14)

lied shipping in these waters 18 months ago. Possibly even more significant is the fact that the shipment of some Colombian crude oil to California has already been undertaken to make up for declining production there.

The increasing tempo of the tanker construction program is apparent from the following table showing deliveries for the first 5 months of this year:

Month—	Oceangoing	Coastal
January	5	0
February	9	0
March	12	0
April	13	3
May	15	1
June	11	3
Total	65	7

The 65 tankers completed in the first 6 months of 1943 compares with 62 completed in all of last year. It is probable that more than twice as many will be completed in the remaining months of this year so that total tanker deliveries for 1943 will come close to 200. Other factors enhancing the tanker position are their ability to "run free" and not be subject to the speed of slower ships in convoys and the opening of the Mediterranean which will enable a sizeable reduction in the transportation of Bunker C fuel oil.

Regardless of whether increased exports from Latin America come to this country or are taken to the West Indian refining centers, Aruba and Curacao, the net effect would be to reduce the burden on the domestic industry. At the same time the supplying of European or African military demands directly from the Caribbean and Gulf area would improve the East Coast situation since a large part of the oil now being moved to the East Coast via pipe line, tank car and barge is now going to supply offshore military demands.

Barnsdall Acquires Union's Properties in Victoria County

VICTORIA, Tex.—Barnsdall Oil Co. has purchased the Union Oil Co. properties in the Keeran field, Victoria County, Texas. The deal, consideration of which was not disclosed, involved nine producers, seven oil and gas wells, and 4,820 acres of undeveloped leases, all on the Keeran ranch, in the eastern part of the county. Barnsdall drilled its first well in Victoria County in 1936, and now has 126 producing wells in the county.

Federal Order Digest

PAW Regulations

Secondary Recovery—PAO 11, SO 6, amended: Facilitates acquisition of equipment for use in secondary-recovery operations, permitting use of materials, under certain limitations, without regard to the restrictions otherwise imposed by PAO 11, effective June 30.

Appointments—James E. Pew, as assistant director of Natural Gas and Natural Gasoline Division; Charles E. Webber, as chief of the natural-gasoline section.

Resignations—John Downing, as assistant director of the Marketing Division.

WPB Orders

Laboratory Material—PRO P-43 and GLO L-144, amended: First assigns preference rating and allotment symbol; latter provides maximum values for equipment orders which can be placed and filled without specific WPB approval, both issued June 26.

Construction Machinery—LO L-192, Amendment 2: Eases restrictions on deliveries of certain items of construction machinery for civilian use, effective July 2.

Truck Production—Sets production schedule of 7,500 heavy highway trucks and 241 off-the-highway automotive vehicles, for third and fourth quarters, issued July 1.

Oil Burners — LO L-74, amended and LO L-79, Amendment 1: Further restricts manufacture and seeks more equitable distribution of remaining stocks, both effective June 28.

Antifreeze Containers — LO L-307: Prohibits use of any new containers of less than 5-gal. capacity for packaging other than glycol antifreeze, effective June 26.

OPA Rationing Rules

Gasoline — RO-5c, Amendment 56: Excludes railroads, bus and truck lines and others who buy gasoline solely for their own use in definition of licensed distributors, effective July 1.

Gasoline—RO-5c, Amendment 57: Requires dealers and distributors to provide address of the particular station where coupons are accepted, in filling out gummed-sheet forms, effective June 29.

Gasoline — RO-5c, Amendment 58: Provides for limited restoration of mileage to war workers in the northeastern plants to maintain maximum production, where transportation facilities are unavailable or inadequate, effective June 28.

Gasoline — RO-5c, Amendment 59: Restricts automobile travel by volunteers and government employes in performing official business, effective July 7.

Gasoline — RO-5c, Amendment 62: Discontinues issuance of special rations for travel to Victory gardens; rations already issued may be used as long as valid, effective July 12.

Lubricating Oil—RPS 88, Amendment 111: Requires that ceiling price must be first obtained from OPA before selling waste lubricating oil or re-refined lubricating oil for fuel-oil purposes, effective June 26.

War Products—RSR 1, Amendment 16: Discontinues requirement for the filing of contracts or summaries for the sale of aviation gasoline, synthetic rubber, toluene and agricultural components, effective July 6.

Cunningham Promoted in Continental Sales Staff

PONCA CITY, Okla.—A man who started his career selling Denver papers and who joined Continental Oil Co. as an office boy 27 years ago, has been named assistant general sales manager of the company.

He is J. R. (Jack) Cunningham. His appointment, effective July 1, was announced last week by Harry J. Kennedy, vice president in charge of marketing.

Mr. Cunningham's first job with the Continental company was as an office boy and messenger in the general offices at Denver at the age of 19. He next worked in the accounting department and after a few months there he transferred to the order and distribution section of the traffic department.

Following the Continental-Marland merger, he came to Ponca City in 1930 as chief clerk in the new order and distribution division. After a year in this position he was made an assistant on the general office sales staff, and in May 1937 was named to be assistant manager of sales administration, the job he held at the time of his promotion.

Ickes Values Country's Oil at 75 Billion

WASHINGTON, D. C.—Petroleum Administrator Ickes last week estimated value of the United States' petroleum resources at $75,000,000,000 in evaluating the country's total physical assets at $12,023,000,000,000 — 12 trillion, 23 billion dollars.

Less Critical Fuel-Oil Situation in Prospect

by J. P. O'Donnell

Deliveries at the average rate of 1,533,000 bbl. daily during the final quarter this year and the first 3 months in 1944 are in prospect, an increase of 397,000 bbl. over the shipments last winter. This is the prime factor in the conclusions herein that the distress conditions of a year ago will be somewhat mitigated in the coming winter.

NEW YORK.—Because of the many unpredictable factors involved, it is impossible to forecast with any accuracy what the fuel-oil supply situation on the East Coast will be next winter. However, a cursory study of available indexes indicates that the situation will be tight but will not be sufficiently severe to cause the distress that was experienced, particularly in the Northeast, during the winter of 1942-43.

The improvement in the prospects is attributed solely to the large increase in shipments of all petroleum products into District 1 that are anticipated for the coming winter. During the last 3 months of 1942 and the first quarter of 1943, these shipments averaged 1,136,000 bbl. per day. In the last quarter of 1943 and the first quarter of 1944 they are expected to average 1,533,000 bbl. which, if realized, will be a gain of 397,000 bbl. per day or 35 per cent over the corresponding period of a year earlier.

Inventories Remain Low

During the past winter, the deliveries of 1,136,000 bbl. per day were augmented by withdrawals of refined products from storage at a rate which averaged an estimated 100,000 bbl. per day. Unless there is a sharp increase in the stocks available for civilian consumption in the interim, this dependency on storage will not be possible in the coming winter. The A.P.I. index, which uses the year 1940-41 as a norm, stood at 27.6 on June 19 and rose to 29.5 on June 26. A year ago it was about 50, leaving current stocks much below desirable levels.

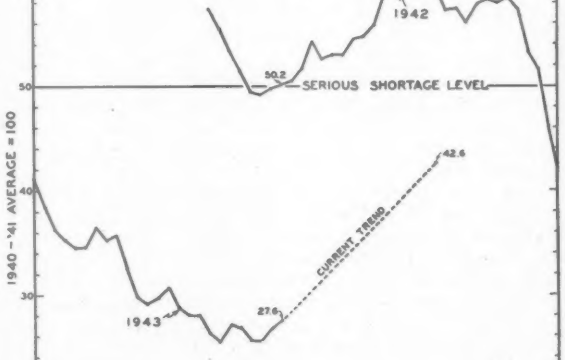
The A.P.I. index rose for the third consecutive time in the week ended June 26 possibly signalizing the beginning of a long overdue upward trend. If this trend continues until the first of October it will reach 42.6 at the normal beginning of the heating-oil season. This would compare with 59.6 on October 3, 1942, which would indicate that available stocks then would be approximately 30 per cent less than they were a year before.

It is likely that the upswing in the index will be more pronounced in the third quarter of this year, particularly if present restrictions on gasoline consumption are continued. This probability results from the fact that inauguration of deliveries all the way to the East Coast via the 24-in. line will occur in this period. The line is scheduled for completion in August. In this event, available stocks could conceivably reach a level comparable to that of the early fall of 1942 which would again make appreciable withdrawals possible.

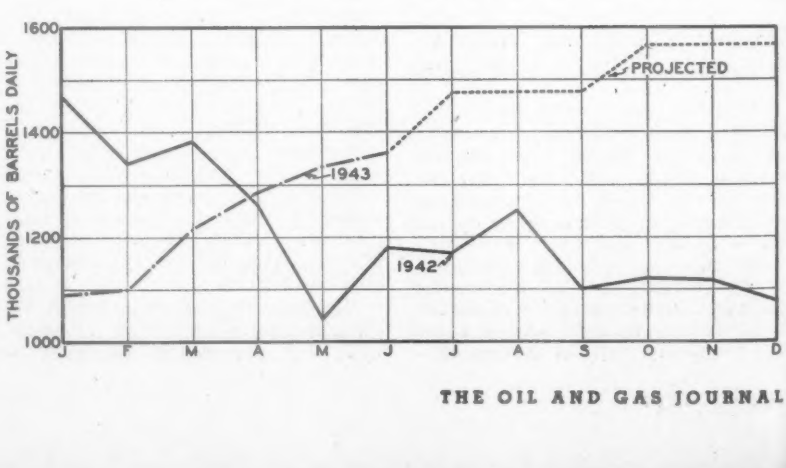
The unknown factor affecting the situation is the extent of offshore shipments from the East Coast. There will unquestionably be a continuing increase in the military demand for North Africa and the United Kingdom and there will be increased means to supply this demand. Even though the tanker program is well behind schedule, United States yards are building tankers faster than they are being destroyed. In the first 6 months of this year a total of 65 tankers, including 7 of the coastal type, were completed in domestic yards. However, in May, the best month, only 15 ocean-going tankers were completed, 25 per cent below the level predicted for that month earlier in the year. Now the peak of 20 per month is not expected to be realized until August.

However, even if the overseas military requirements do grow substantially, the indicated increase of 350,000 to 400,000 bbl. per day in shipments into District 1 in the final quarter of this year and the first quarter of next year will more than offset the growth in exports. In addition, if present consumption restrictions are rationed and there is a more pronounced improvement in the available stocks position thus allowing for some withdrawals from storage, the heating-oil supply situation will be considerably easier this coming winter.

Right: Relationship of eastern supplies, showing current level and projected trend considerably below serious shortage line. The A.P.I. index stood at 29.5, following the projected trend



Below: Petroleum deliveries to East Coast steadily mounting over rates prevailing last year



Oil Operators Will Benefit By New Tax Regulation on Intangible Drilling Costs

WASHINGTON, D. C.—The new internal revenue regulation on tax treatment of intangible drilling costs (T.D. 5276) is expected to be of considerable benefit to oil and gas operators through its general restatement and clarification of the law.

The new regulation retains the option to charge off intangible development costs to either capital or business expense, but incorporates interpretations and court decisions which have been built up in recent years. However, courts have ruled that the option of the previous regulations did not apply to turnkey and obligation wells, and that expenses must not be capitalized in such cases. These two provisions now have been removed, and the option now applies to them as well as to other types of wells.

The only exception to the option which is retained is that where drilling or development is done for a grant or assignment of a fraction of the operating rights, only that portion of the costs attributable to this fraction comes within the option. This exception is not new, but is more clearly stated in the new regulation.

Option Must Be Stated

The regulation requires that a new option be determined for the first tax year following December 31, 1942, thus giving operators a chance to change from their former basis if desired. If no option is elected, the Bureau of Internal Revenue will consider that costs are being charged off as depletion and depreciation.

Here is a summary of what the new income-tax regulations provide:

1. The provisions as now written in the regulations are applicable only to taxable years beginning prior to January 1, 1943.

2. Similar options are provided as to expensing or capitalization of intangible drilling and development costs for taxable years beginning after December 31, 1942, to "an operator" (one who holds a working or operating interest in any tract or parcel of land either as a fee owner or under a lease or any other form of contract granting working or operating rights).

3. The amendment includes a new provision with respect to intangible drilling and development costs, stating: "They include the cost to operators of any drilling and development work (excluding amounts payable only out of production or the gross proceeds from production, and amounts properly allocable to cost of depreciable property) done for them by contractors under any form of contract, including turnkey contracts."

4. A new provision included in this option are all costs of drilling and development undertaken (directly or through contract) by an operator of an oil and gas property whether incurred by him prior or subsequent to the formal grant or assignment to him of operating rights, or working interest).

5. New provisions have been written with respect to cost of nonproductive wells (dry holes) permitting deduction as an ordinary loss provided a proper election is made in the return for the first taxable year beginning after December 31, 1942, in which such nonproductive well is completed. This is a new election and when made shall be binding for all subsequent years.

6. The amendment grants a new option with respect to intangible-drilling and development costs incurred by an operator in a taxable year beginning after December 31, 1942, in the development of oil and gas properties, and requires a new election under such option and requires that such operator make a "clear statement of election under this option" in his tax return.

Full Text of the New Ruling

TITLE 26—INTERNAL REVENUE

Chapter 1—Bureau of Internal Revenue

Subchapter A—Income and Excess-Profits Taxes

(T. D. 5276)

PART 19—INCOME TAX UNDER THE INTERNAL REVENUE CODE

Charges to Capital and to Expense in the Case of Oil and Gas Wells

Section 19.23 (m)-16 of Regulations 103 (Part 19, Title 26, Code of Federal Regulations, 1940 Sup.) is amended as follows:

Paragraph 1. By striking out the section number, the heading and opening words of the section, which reads, "Sec. 19.23 (m)-16 **Charges to capital and to expense in case of oil and gas wells.** (a) Items chargeable to capital or to expense at the taxpayer's option," and by inserting in lieu thereof the following:

Sec. 19.23 (m)-16 **Charges to capital and to expense in the case of oil and gas wells—(a) Taxable years beginning prior to January 1, 1943.** The provisions of this paragraph apply only to taxable years beginning prior to January 1, 1943.

1. Items chargeable to capital or to expense at taxpayer's option:

Par. 2. By striking out (b), (c), and (d) wherever occurring, and by inserting in lieu thereof (2), (3), and (4), respectively.

Par. 3. By striking out (1), (2), and (3) wherever occurring, and by inserting in lieu thereof (i), (ii), and (iii), respectively.

Par. 4. By striking out "this section" in the first sentence of paragraph (d), prior to its amendment by this Treasury decision, and by inserting in lieu thereof "paragraph (a) of this section."

Par. 5. By striking out "this section" in the first sentence of paragraph (c) (2), prior to its amendment by this Treasury decision, and by inserting in lieu thereof "paragraph (a) of this section."

Par. 6. By inserting at the end of the section the following:

(b) **Taxable years beginning after December 31, 1942.** The provisions of this paragraph apply only to taxable years beginning after December 31, 1942.

1. Items chargeable to capital or to expense at taxpayer's option:

(i) Option with respect to intangible drilling and development costs incurred by an operator (one who holds a working or operating interest in any tract or parcel of land either as a fee owner or under a lease or any other form of contract granting working or operating rights) in the development of oil and gas properties: All expenditures made by an operator for wages, fuel, repairs, hauling, supplies, etc., incident to and necessary for the drilling of wells and the preparation of wells for the production of oil or gas, may, at the option of the operator, be deducted from gross income as an expense or charged to capital account. Such expenditures have for convenience been termed intangible drilling and development costs. They include the cost to operators of any drilling or development work (excluding amounts payable only out of production or the gross proceeds from production, and amounts properly allocable to cost of depreciable property) done for them by contractors under any form of contract, including turnkey contracts. Examples of items to which this option applies are, all amounts paid for labor, fuel, repairs, hauling, and supplies, or any of them, which are used (a) in the drilling, shooting, and cleaning of wells; (b) in such clearing of ground, draining, road making, surveying, and geological work as are necessary in preparation for the drilling of wells; and (c) in the construction of such derricks, tanks, pipe lines, and other physical structures as are necessary for the drilling of wells and the preparation of wells for the production of oil or gas. In general, this option applies only to expenditures for those drilling and developing items which in themselves do not have a salvage value. For the purpose of this option labor, fuel, repairs, hauling, supplies, etc., are not considered as having

a salvage value, even though used in connection with the installation of physical property which has a salvage value. Included in this option are all costs of drilling and development undertaken (directly or through a contract) by an operator of an oil and gas property whether incurred by him prior or subsequent to the formal grant or assignment to him of operating rights (a leasehold interest, or other form of operating rights, or working interest); except that in any case where any drilling or development project is undertaken for the grant or assignment of a fraction of the operating rights, only that part of the costs thereof which is attributable to such fractional interest is within this option. In the excepted cases, costs of the project undertaken, including depreciable equipment furnished, to the extent allocable to fractions of the operating rights held by others, must be capitalized as the depletable capital cost of the fractional interest thus acquired.

(ii) If deductions for depreciation or depletion have either on the books of the taxpayer or in his returns of net income been included in the past in expense or other accounts, rather than specifically as depreciation or depletion, or if capital expenditures have been charged to expense in lieu of depreciation or depletion, a statement indicating the extent to which this practice has been carried should accompany the return.

2. Recovery of optional items, if capitalized:

(i) Items returnable through depletion: If the taxpayer charges such expenditures as fall within the option to capital account, the amounts so capitalized and not deducted as a loss are returnable through depletion in so far as they are not represented by physical property. For the purpose of this section the expenditures for clearing ground, draining, road making, surveying, geological work, excavation, grading, and the drilling, shooting, and cleaning of wells, are considered not to be represented by physical property, and when charged to capital account are returnable through depletion.

(ii) Items returnable through depreciation: If the taxpayer charges such expenditures as fall within the option to capital account, the amounts so capitalized and not deducted as a loss are returnable through depreciation in so far as they are represented by physical property. Such expenditures are amounts paid for wages, fuel, repairs, hauling, supplies, etc., used in the installation of casing and equipment and in the construction on the property of derricks and other physical structures.

(iii) In the case of capitalized intangible drilling and development costs incurred under a contract, such costs shall be allocated between the foregoing classes of items for the purpose of determining the depletion and depreciation allowances.

(iv) Option with respect to cost of nonproductive wells: If the operator has elected to capitalize intangible drilling and development costs, then an additional option is accorded with respect to intangible drilling and development costs incurred in drilling a nonproductive well. Such costs incurred in drilling a nonproductive well may be deducted by the taxpayer as an ordinary loss provided a proper election is made in the return for the first taxable year beginning after December 31, 1942, in which such a nonproductive well is completed. Such election with respect to intangible drilling and development costs of nonproductive wells is a new election, and, when made, shall be binding for all subsequent years. Any taxpayer who incurs optional drilling and development costs in drilling a nonproductive well must make a clear statement of election under this option in the return for the first taxable year beginning after December 31, 1942, in which such nonproductive well is completed. The absence of a clear indication in such return of an election to deduct as ordinary losses intangible drilling and development costs of nonproductive wells shall be deemed to be an election to recover such costs through depletion to the extent that they are not represented by physical property, and through depreciation to the extent that they are represented by physical property.

3. Nonoptional items distinguished:

(i) **Capital items.** The option with respect to intangible drilling and development costs does not apply to expenditures by which the taxpayer acquires tangible property ordinarily considered as having a salvage value. Examples of such items are the costs of the actual materials in those structures which are constructed in the wells and on the property, and the cost of drilling tools, pipe, casing, tubing, tanks, engines, boilers, machines, etc. The option does not apply to any expenditures for wages, fuel, repairs, hauling, supplies, etc., in connection with equipment, facilities, or structures, not incident to or necessary for the drilling of wells, such as structures for storing or treating oil or gas. These are capital items and are returnable through depreciation.

(ii) **Expense items.** Expenditures which must be charged off as expense, regardless of the option provided by paragraph (b) of this section, are those for labor, fuel, repairs, hauling, supplies, etc., in connection with the operation of the wells and of other facilities on the property for the production of oil or gas.

4. Paragraph (b) of this section grants a new option with respect to intangible drilling and development costs incurred by an operator in a taxable year beginning after December 31, 1942, in the development of oil and gas properties, and requires a new election under such option. Any operator who incurs such costs must make a clear statement of election under this option in the return for the first taxable year beginning after December 31, 1942, in which such costs are incurred. The absence of a clear indication in such return of an election to deduct as expenses intangible drilling and development costs shall be deemed to be an election to recover such costs through depletion to the extent that they are not represented by physical property and through depreciation to the extent that they are represented by physical property. This election is binding for all subsequent years.

DEATHS

E. M. Skeehan, Jr., 26, son of E. M. Skeehan, vice president and treasurer of Barnsdall Oil Co., was killed June 28 in an airplane crash at sea somewhere off the Atlantic Coast. He was an aviation machinist's mate, second class, in the Navy. Mr. Skeehan enlisted in April 1942 from California where he had been working for Barnsdall Oil Co.

Benjamin Allan Williamson, Oil City, Pa., retired official of Southern Group Pipe Line Co., died in an Oil City hospital last week, following an illness of a little less than a month. Mr. Williamson began his service with the Southern Group in 1911, and retired after 21 years of service.

Fred McGinnis, chief clerk of the pipe-line department of Gulf Oil Corp., died in a Houston, Tex., hospital last week. He had lived in Houston for 26 years. His widow survives.

William O. Stogner, 66, independent oil operator of Norman, Okla., died last week. Mr. Stogner drilled some of the first gas wells in the Chickasha field. He first entered the oil business in St. Joe, Tex., and moved to Norman in 1916. He retired 7 years ago, leaving the ownership of the company to his son, George W. Stogner. Other survivors are his widow and four daughters.

Clarence Laird, 69, East Texas oil man, of Kilgore, Tex., died in a Dallas, Tex., hospital last week while attending his wife, who is still in a critical condition there. In addition to his widow, he is survived by a son.

Donald B. Collins, 47, production manager for Shell Oil Co., Inc., Houston, Tex., died July 3 in a Houston hospital. Mr. Collins was born in Grass Valley, Calif., graduated from the University of California, and had resided in Houston 9 years. He was a member of the A.I.M.E., Houston Club, Brae-Burn Country Club, and the A.P.I. He leaves his wife, one son, and one daughter.

James F. M. Moodie, 64, president of the Sentinel Oil Co. since 1927, and for many years active in Alberta oil development, died at Calgary on June 23.

B. F. Dowd, 84, a veteran of the natural-gas industry in the United States and Canada, died at Buffalo, N. Y., recently. He was superintendent of the Volcanic Gas & Oil Co., which first marketed gas from that field, and was later superintendent of Union Gas Co. of Canada.

Ralph H. Beaton, 67, president of the Vulcan Gas Co., Columbus, Ohio, died there last week at a hospital where he was undergoing observation. Mr. Beaton was also past president of the Columbus Gallery of Fine Arts and a director at the time of his death.

Paul Elliott, 63, superintendent for the Lane Oil & Gas Co., Centralia, Ill., formerly associated with the Benedum & Trees interests, died July 1 at a Shreveport, La., hospital.

W. C. Moore, 85, president of the Hardy Oil Co., the La-Tex Oil Co. and the La-Jarza Oil Co., all three active in Texas and Louisiana operations, died July 1 in a Houston, Tex., hospital. He had been active in the Texas oil industry since Spindletop was discovered. He was one of the discoverers of the Markham field. The Hardy company was organized in 1908, and has been active in exploration and production operations for 35 years.

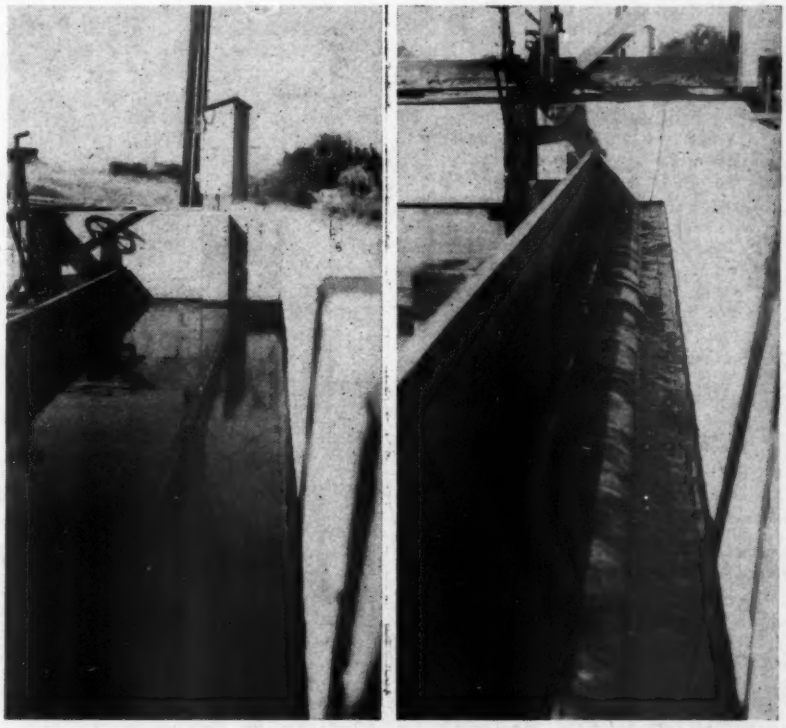
J. A. Leidecker, 62, associated with Hollingsworth Drilling Co., Longview, Tex., died in that city June 2. He had been in the oil business for many years and formerly headquartered in San Angelo, Tex.

Construction and Operation of a Water-Treatment and Disposal Plant

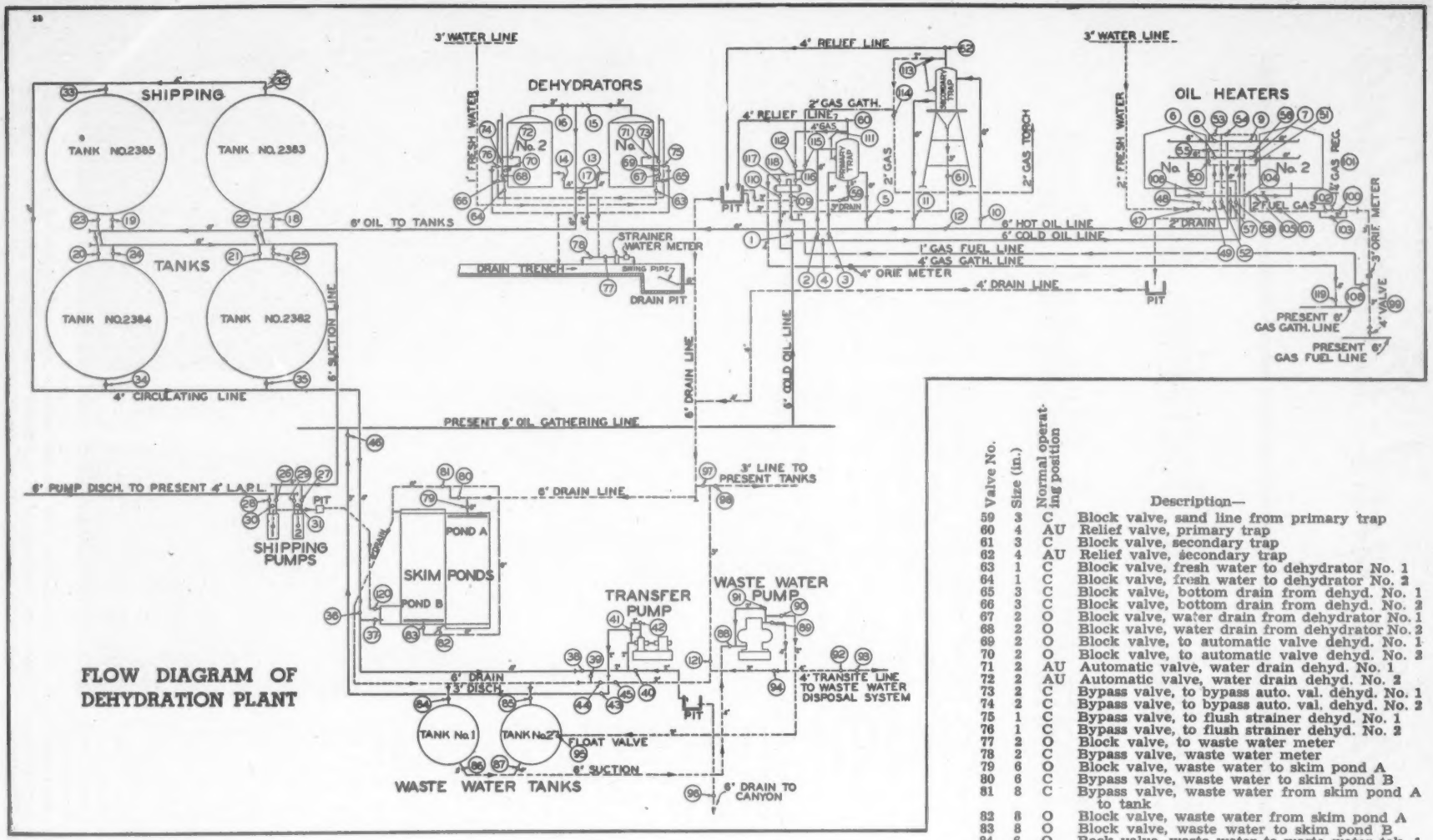
Faced with the problem of handling large quantities of emulsion with old equipment and a diminishing labor force, an oil company revamped its old system in such a way as to increase its efficiency and, at the same time, make it almost automatic in operation.

PRODUCING a wet oil in one district and treating it to break down the emulsion in another—frequently several miles from the first—offers a pumping and pipe-line problem which requires two different groups of employes to operate, and at the same time requires greatest attention from the pipe-line maintenance crew because of the pressure necessary to pump the commodity through the transfer system. In one well-known field from which oil has been produced in quantities for many years, the emulsion cut has increased gradually until recently the pressure necessary to ship the oil required an average of 350 lb. per sq. in. on the shipping pumps. The transfer line had been in service for many years and had become thin because of wear and external corrosion, and the 350 lb. at the field end was about as high as could be maintained with any degree of safety. Two solutions of this problem were offered the executives of the company by the engineers. The first included laying a new pipe line from the field receiving tanks to the distant treating plant, and the installation of a battery of new shipping pumps. The solution, however, in reality solved nothing except to remove the pipe-line leaking hazard from the system which, if put into operation, would still deliver wet, emulsified oil to the old treating plant. The second solution included revamping the entire gathering and flow-line system of the producing properties, the construction of a unattended flow-line treating plant on the property and disposing of the separated water so that only clean pipe-line oil would be shipped to the pipe-line receiving station.

The lead lines from the individual wells to the trunk gathering line through the property had been well maintained so that only a minimum amount of repair and replacement was necessary before or immediately after the changeover. The trunk line terminated at a central battery of field tanks from which the wet oil was pumped by the shipping pumps and the site selected for the erection of the new treating plant was near this line so that no extension or addition to the gathering system was required. The grounds for the treating plant were on a sloping hillside which provided natural facilities for transferring fluid from any tank on the crest to others lower on the grade, thus eliminating pumping of waste water and tank drainings. The battery of old tanks



Left: Sharp-edged weir provides uniform cross-sectional flow of water and gives maximum separation of oil and water. Right: Distributor pipe at one end of skimmer section designed to spread raw water equally over entire length of inlet frame



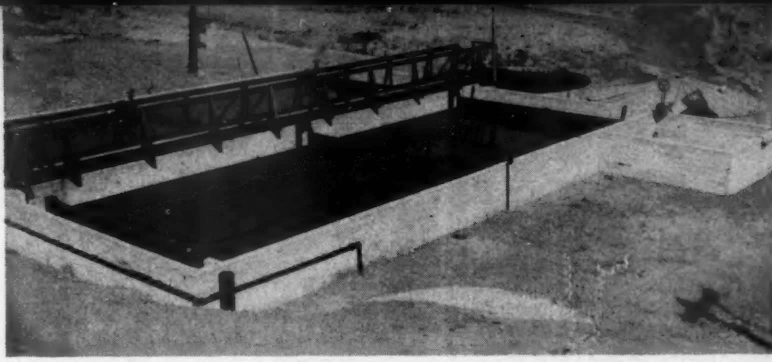
Valve No.	Size (in.)	Normal operating position	Description—
1	6	C	Bypass valve, heaters and traps
2	6	O	Bock valve, oil to primary trap
3	6	O	Block valve, oil from primary trap
4	6	C	Bypass valve, primary trap
5	4	C	By-pass valve, oil from prim. trap to bypass heater
6	6	O	Block valve, oil to heater No. 1
7	6	O	Block valve, oil to heater No. 2
8	6	O	Block valve, oil from heater No. 1
9	6	O	Block valve, oil from heater No. 2
10	6	O	Block valve, oil to secondary trap
11	6	O	Block valve, oil from secondary trap
12	6	O	Bypass valve, secondary trap
13	4	C	By-pass valve, oil from sec. trap to bypass heater
14	6	O	Block valve, oil to heater No. 2
15	6	O	Block valve, oil to heater No. 1
16	6	O	Block valve, oil from heater No. 1
17	6	O	Block valve, oil from heater No. 2
18	6	O	Block valve, oil to secondary trap
19	6	O	Block valve, oil from secondary trap
20	6	O	Bypass valve, secondary trap
21	4	C	By-pass valve, oil from sec. trap to bypass heater
22	6	O	Block valve, oil to heater No. 2
23	6	O	Block valve, oil to heater No. 1
24	6	O	Block valve, oil from heater No. 1
25	6	O	Block valve, oil from heater No. 2
26	6	O	Block valve, oil to secondary trap
27	6	O	Block valve, oil from secondary trap
28	6	O	Bypass valve, secondary trap
29	4	C	By-pass valve, oil from sec. trap to bypass heater
30	6	O	Block valve, oil to heater No. 2
31	6	O	Block valve, oil to heater No. 1
32	6	O	Block valve, oil from heater No. 1
33	4	C	Block valve, circ. pump suct. from tank 2385
34	4	C	Block valve, circ. pump suct. from tank 2384
35	4	C	Block valve, circ. pump suct. from tank 2382
36	4	C	Block valve, circ. pump suct. from ship. tanks
37	4	O	Block valve, suct. from pit to circ. pump
38	2	O	Block valve, suct. from ship. tanks and skim. oil pit
39	3	C	Block valve, circ. pump from waste water tks.
40	3	C	Block valve, circ. pump suct. from pit
41	2	AU	Check valve, circ. pump discharge
42	2	AU	Relief valve, circ. pump discharge
43	2	O	Block valve, circ. pump discharge to oil g. line
44	3	C	Block valve, circ. pump discharge to water tks.
45	3	C	Block valve, circ. pump discharge to pit
46	6	C	Block valve, oil from pump to present 4" L.A.P.L.
47	2	O	Block valve, drain from oil heaters
48	2	O	Block valve, drain from oil heaters
49	2	O	Block valve, drain from oil heaters
50	2	O	Block valve, drain from oil heaters
51	2	O	Block valve, drain from oil heaters
52	2	O	Block valve, drain from oil heaters
53	2	O	Block valve, drain from oil heaters
54	2	O	Block valve, drain from oil heaters
55	2	O	Block valve, drain from oil heaters
56	2	O	Block valve, drain from oil heaters
57	2	O	Block valve, drain from oil heaters
58	2	O	Block valve, drain from oil heaters
59	3	C	Block valve, sand line from primary trap
60	4	AU	Relief valve, primary trap
61	3	C	Block valve, secondary trap
62	4	AU	Relief valve, secondary trap
63	1	C	Block valve, fresh water to dehydrator No. 1
64	1	C	Block valve, fresh water to dehydrator No. 2
65	3	C	Block valve, bottom drain from dehyd. No. 1
66	3	C	Block valve, bottom drain from dehyd. No. 2
67	2	O	Block valve, water drain from dehydrator No. 1
68	2	O	Block valve, water drain from dehydrator No. 2
69	2	O	Block valve, to automatic valve dehyd. No. 1
70	2	O	Block valve, to automatic valve dehyd. No. 2
71	2	AU	Automatic valve, water drain dehyd. No. 1
72	2	AU	Automatic valve, water drain dehyd. No. 2
73	2	C	Bypass valve, to bypass auto. val. dehyd. No. 1
74	2	C	Bypass valve, to bypass auto. val. dehyd. No. 2
75	1	C	Bypass valve, to flush strainer dehyd. No. 1
76	1	C	Bypass valve, to flush strainer dehyd. No. 2
77	2	O	Block valve, to waste water meter
78	2	C	Bypass valve, waste water meter
79	6	O	Block valve, waste water to skim pond A
80	6	C	Bypass valve, waste water to skim pond B
81	8	C	Bypass valve, waste water from skim pond A to tank
82	8	O	Block valve, waste water from skim pond A
83	8	O	Block valve, waste water to skim pond B
84	6	O	Bock valve, waste water to waste water tak. 1
85	6	O	Block valve, waste water to waste water tk. 2
86	4	O	Block valve, suction from waste water tank 1
87	4	O	Block valve, suction from waste water tank 2
88	4	O	Block valve, suction to waste water pump
89	4	O	Block valve, discharge from waste water pump
90	2	O	Block valve, discharge return from waste water pump to tank
91	2	AU	Relief valve, waste water pump discharge
92	4	AU	Check valve, waste water pump discharge
93	4	O	Block valve, waste water pump discharge to disposal line
94	3	C	Block valve, waste water pump discharge to reserve tanks
95	2	AU	Lever valve, to regulate waste water pump return discharge to tank
96	6	O	Block valve, drain from pit to canyon
97	3	C	Block valve, water pump discharge to skim pond inlet
98	3	C	Block valve, waste water line to reser. tanks
99	4	O	Block valve, gas fuel line to heaters
100	2	O	Block valve, gas fuel line to regulator
101	1¼	AU	Reducing regulator on gas fuel line
102	2	O	Block valve, gas fuel line to heaters
103	2	O	Block valve, gas fuel line to heaters
104	2	O	Block valve, gas fuel line to heaters
105	2	O	Block valve, gas fuel line to heaters
106	2	O	Block valve, gas fuel line to heaters
107	2	O	Block valve, gas fuel line to heaters
108	2	O	Block valve, gas fuel line to heaters
109	2	O	Block valve, gas fuel line to heaters
110	2	O	Block valve, gas fuel line to heaters
111	2	O	Block valve, gas fuel line to heaters
112	2	O	Block valve, gas fuel line to heaters
113	2	O	Block valve, gas fuel line to heaters
114	2	O	Block valve, gas fuel line to heaters
115	2	O	Block valve, gas fuel line to heaters
116	2	O	Block valve, gas fuel line to heaters
117	2	O	Block valve, gas fuel line to heaters
118	2	O	Block valve, gas fuel line to heaters
119	2	O	Block valve, gas fuel line to heaters

8	6	O	Block valve, oil from heater No. 1
9	6	O	Block valve, oil from heater No. 2
10	6	O	Block valve, oil to secondary trap
11	6	O	Block valve, oil from secondary trap
12	6	C	Bypass valve, secondary trap
13	4	O	Block valve, oil to dehydrator No. 1
14	4	O	Block valve, oil to dehydrator No. 2
15	3	O	Block valve, oil from dehydrator No. 1
16	3	O	Block valve, oil from dehydrator No. 2
17	6	C	Bypass valve, to bypass dehydrators
18	6	AS	Block valve, filling line to tank 2383
19	6	AS	Block valve, filling line to tank 2385
20	6	AS	Block valve, filling line to tank 2384
21	6	AS	Block valve, filling line to tank 2382
22	6	AS	Block valve, suction line from tank 2383
23	6	AS	Block valve, suction line from tank 2385
24	6	AS	Block valve, suction line from tank 2384
25	6	AS	Block valve, suction line from tank 2382
26	4	AS	Block valve, suction line to pump No. 1
27	4	AS	Block valve, suction line to pump No. 2
28	2	AS	Block valve, discharge from pump No. 1
29	2	AS	Block valve, discharge from pump No. 2
30	2	C	Bypass valve, discharge to suct. of pump No. 1
31	2	C	Bypass valve, discharge to suct. of pump No. 2
32	4	C	Block valve, circ. pump suct. from tank 2383

*C, closed; O, open; AS, as required; AU, automatic.

40	2	C	Block valve, circ. pump suct. from pit
41	2	AU	Check valve, circ. pump discharge
42	2	AU	Relief valve, circ. pump discharge
43	2	O	Block valve, circ. pump discharge to oil g. line
44	3	C	Block valve, circ. pump discharge to water tks.
45	3	C	Block valve, circ. pump discharge to reserve tanks
46	3	O	Block valve, circ. pump discharge to oil g. line
47	2	C	Block valve, fresh water line to heaters
48	1	O	Vent valve, fresh water line between fresh water supply and heaters
49	2	C	Block valve, water line to heater inlet manif.
50	2	C	Block valve, water or drain line to inlet manif. of heater No. 1
51	2	C	Block valve, water or drain line to inlet manif. of heater No. 2
52	2	C	Block valve, water line to heater outlet manif.
53	2	C	Block valve, water or drain line to outlet manif., heater No. 1
54	2	C	Block valve, water or drain line to outlet manif., heater No. 2
55	2	AU	Relief valve, heater No. 1
56	2	AU	Relief valve, heater No. 2
57	2	O	Block valve, drain line from heater outlet manifold
58	2	O	Block valve, drain line from heater inlet manif.

			pond inlet
98	3	C	Block valve, waste water line to reser. tanks
99	4	O	Block valve, gas fuel line to heaters
100	2	O	Block valve, gas fuel line to regulator
101	1¼	AU	Reducing regulator on gas fuel line
102	2	O	Block valve, gas fuel line from regulator
103	2	C	Bypass valve for regulator
104	2	O	Block valve, gas fuel to heater No. 1
105	2	O	Block valve, gas fuel to heater No. 2
106	2	AU	Burner control valve heater No. 1
107	2	AU	Burner control valve heater No. 2
108	1	O	Block valve, gas fuel to drip tank
109	1	C	Block valve, gas fuel to drip tank
110	1	C	Block valve, drain from drip to oil line
111	2	AU	Lever valve, gas line from primary trap
112	4	O	Block valve, gas line from primary trap
113	2	AU	Lever valve, gas line from secondary trap
114	2	C	Block valve, gas line from traps to torch
115	2	O	Block valve, gas line from secondary trap
116	4	O	Block valve, gas to drip tank
117	4	O	Block valve, gas line from drip tank
118	4	C	Bypass valve, gas line drip
119	4	O	Block valve, gas line to gas gathering system
120	4	AU	Check valve, drain from pump pit to skim pond pit
121	3	C	Block valve, water pump disch. to reser. tanks



Skim ponds receive oil-bearing water from dehydrators, separate the two, returning the oil to the dehydrators and delivering the water to the disposal system

was not disturbed and are maintained in condition for emergency use.

The principal items installed in the new treating plant include—as the oil flows through the unit—a primary separator to remove entrained gases, twin oil-heating furnaces, a secondary separator to remove gas derived from the oil by heating in the furnaces, two electrical dehydrators and four shipping tanks with a complement of two gas-engine-driven shipping pumps. The water-disposal system at the plant includes a main drain trench between the two pairs of shipping tanks and running alongside the dehydrators with a pipe line leading to the skimmers. The latter is divided in two units separated by a concrete dividing wall, and each unit equipped with a center baffle to form a two-section skim pond in each unit. Clean disposable water flows from this double unit into receiving tanks farther down the slope from which it is pumped continuously to the disposal pipe-line system. Skimmed oil leaves each section to a small sump from which it is returned to the dehydrators for reprocessing.

Following through with the operation of the new plant, the wet oil with a cut varying from well to well but averaging around 50 per cent flows from a connection in the trunk line to an oil and gas separator termed the primary trap. This vessel receives all of the production from the wells connected to the system and removes all produced gas which accompanies the oil from the individual wells. Adequate instrumentation is connected to this vessel to control the flow of both oil and gas and to maintain a constant back pressure which, however, may be varied to suit changing operating conditions if this becomes necessary. Block valves and bypasses are inserted in all the lines to remove any unit from service for inspection, maintenance and adjustment which cannot be done while the plant is in operation.

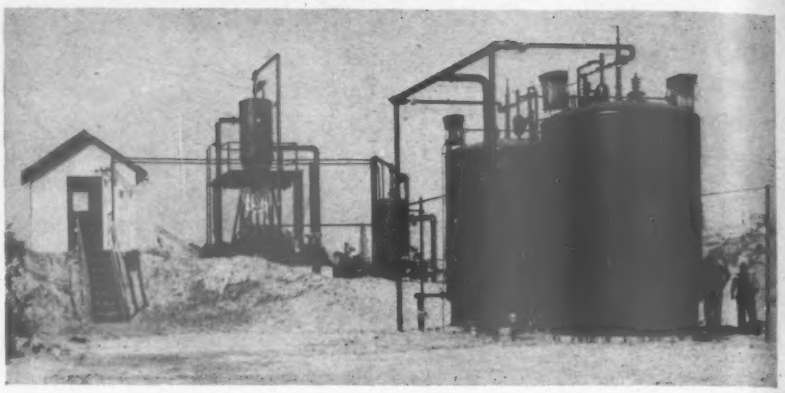
From the primary trap the oil passes through a buried line to the oil heaters installed in twin setting and piped for single operation or parallel flow when both are in use. The heaters have tubes with conventional return bends and are fully equipped with all necessary automatic instruments to maintain a predetermined temperature on the oil, and to keep the flames lighter with a pilot light passing through each burner inlet. The heaters are jacketed to insure economic fuel consumption with shields over the burning openings to prevent air currents from disturbing the fires. The flow of oil through the heaters is from bottom to top with the outlet, or transfer line connected to a 6-in. hot-oil line leading back to the plant and attached to a secondary trap to remove what gas may be released by elevated temperatures. Sludge drains are connected to the base of this trap, as well as to the base of the primary trap, so that accumulation of precipitated material can be drained into a pit for future disposition as it may be necessary.

Flow Through Dehydrators

The hot oil, carried regularly around 180° F. without the use of treating chemicals, passes from the outlet of the secondary trap directly to the dehydrators. These units, two in number are of the conventional type employed in many oil fields for emulsion reduction, are set for parallel flow, but fitted with control valves for single unit operation, or bypassed if necessary. The flow through the dehydrators is from base to top where a header is attached with special couplings for any future addition to the plant without requiring welding or pipe cutting. Water is released from the base of the units and flows into the drain trench which also handles oil drainings and water from the shipping tanks. The clean oil averaging less than 1 per cent cut—considered satisfactorily clean since oil with cuts up to 3 per cent is permissible—flows to any one of the four shipping tanks which may be opened for filling. Operation of the plant as to rate of throughput is governed entirely by the rate at which the individual wells as a group pump oil into the trunk line, while the rate of shipping is governed by the number of pumps employed and the number of tanks gaged out at one time. Two gas-engine-driven pipe-line pumps are operated with parallel suction and parallel discharge and may be run together or only one at a time as occasion demands. The pumps must be started by the operator who cuts in a full tank by opening the appropriate gate valves, which automatically fill a standpipe which is connected to

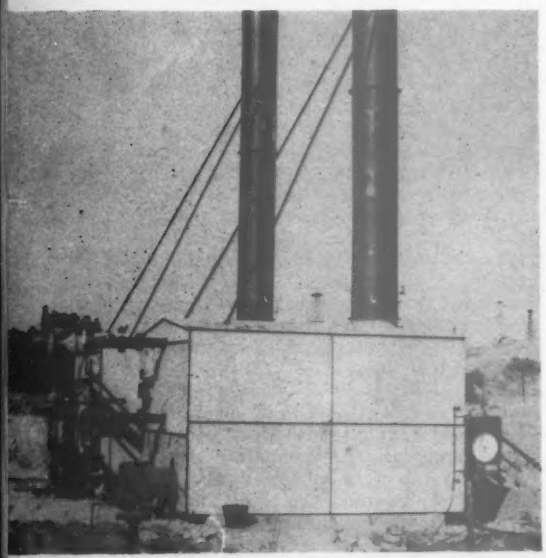
two mercury switches wired to the gas engine magnetos. When the pumps are running smoothly, the operator pays no further attention to them except an occasional cursory inspection. When the oil level falls to the controllers on the standpipe, the action of the mercury switch automatically shorts out the magneto without the operator being at the plant. The pressure required to transfer the clean oil through the pipe line is reduced to around 100 lb. per sq. in. which amounts to approximately 250 lb. per sq. in. reduction in pipe-line pressure as compared with pressures required to handle the wet oil before the treating plant was built.

Water released from the oil at the dehydrators and drained from the shipping tanks with the small amount of entrained oil which is inevitable around an oil-handling plant is led by gravity flow to the skim pond. Flow through the skim ponds is by gravity, which eliminates the requirement for power-driven pumps. The skim ponds are of concrete construction equipped with wood baffles to separate each section into two parts. The water enters the inlet of the first pond through a horizontal pipe perforated on the top to insure distribution uniformly across the entire surface. Likewise, when the water flows from the pond it must pass over a knife-edged spillway so that a uniform cross-section flow is maintained throughout the entire pond. This is necessary to the freeing of tiny droplets of oil from the water. The clean water without a rainbow showing on the surface leaves the last section through an open-top pressure breaker through a pipe line to the waste-water storage tanks. The plunger-type pump which delivers the waste water to the disposal system is motor driven and is equipped with a relief valve on the discharge manifold set to function below the working pressure of the composition pipe line. A bypass line from the pump discharge is fitted with a float-controlled valve so arranged to regulate the flow of waste water through the disposal system in such a manner as to average the rate, and avoid extreme maximum and minimum rates.



Two-unit dehydration plant which is designed for full flow-line operation to reduce the oil to pipe-line specifications in one pass from the wells to the shipping tanks. The vessels in the extreme background are high and low separators to remove gas and vapors before and after heating

Two-unit heater for single or parallel operation to bring the temperature of the oil high enough that emulsion is broken down and pipe-line oil produced in the flow-line dehydrating plant



Skimming Operations

Skimming of the oil from the pond sections is accomplished with inverted-cone-type buckets fitted tightly over the drain pipes passing through the wall of the ponds to the oil-accumulation sump. They are supported by rigid bails attached to the stem of a discarded gate valve with the original bonnet—not suitable for salvage—bracketed to a support carried on the walls of the ponds at a point most convenient for operation. The original wheel of the rising stem valve accompanies the bonnet with the addition of a lever welded to the rising stem to prevent turning of the stem during adjustment of the inverted cone.

A small rotary, motor-driven pump is located outside the fire wall and beside the waste-water tanks for picking up waste oil and oil removed from the skimmers. This material is pumped back to the dehydrators for reprocessing. The skimmed oil which flows into the accumulation sump is pumped by this rotary pump which is started and stopped automatically by a float-controlled switch so that the operator's attention is seldom necessary to see that this is taken care of. The pump is also connected to a recirculating system so that, if a tank of oil is off specification when a sample is put through the centrifuge before shipping, it can be pumped back through the system with fresh oil from the field.

The entire treating plant is as automatic as possible to construct such a unit, so that the operators—who are also the pumpers in the district—are not required to spend unnecessary time making adjustments of the flow, temperature or other working conditions. The shipping pumps must be started by the operators to ship oil from any of the four tanks, but by using a standpipe on the common suction header and a mercury switch for each pump connected to a float case on the standpipe, the pump operated, either one or both of the two, will be automatically shut down when the oil is lowered to a certain level in the shipping tank. Thus, after the pumper has sampled and gaged a tank, the pump is started and runs so long as oil remains at the point above the switch-float level, but immediately upon dropping to the critical point, the switch breaks the circuit to the magneto resulting in shutting down the shipping pump in operation.

One of the most valuable auxiliaries of this oil-treating plant is represented by a complete, detailed flow diagram showing accurately—but not to scale—the location of each operating pipe line, the tanks, dehydrators, heaters, separators and each individual gate or block valve and instrument, numbered on the print and described in a box at one side so that an inexperienced operator can readily understand what is to be done. The valves, instruments and regulators are shown on the diagram and numbered in operating sequence with tags on each wheel, or stem, in the order in which they are most frequently used, following through from the wet-oil gathering line to the shipping pumps. The remainder of the valves are of somewhat minor importance to the operator as the treating engineers usually put the plant into operation and make any necessary adjustment to overcome problems which the average pumper has not the time or training to handle.

TUBE-TURN WELDING FITTINGS—RANGE OF SIZES

Type of Fitting	Description	Standard Weight	Extra Strong	Schedule 160	Double Extra Strong	Light Gauge Nominal Pipe Size	Light Gauge Iron Pipe Size
Elbows	90° Long Radius	½"-24"	¾"-24"	1"-14"	1"-8"	4"-24"	3"-12"
Elbows	90° Short Radius	1"-30"	1½"-30"	1"-14"	1"-8"	4"-24"	3"-12"
Elbows	45° Long Radius	½"-30"*	¾"-30"*	1"-14"	3"-8"	4"-24"	3"-12"
Returns	180° Long Radius	½"-24"	1"-24"				
Returns	180° Short Radius	1"-30"	1½"-30"				
Returns	180° Extra Long Radius	1"-2½"	1"-2½"				
Tees	Straight	½"-24"	½"-24"	1"-12"	1"-8"		
Tees	Reducing Outlet	¾x¾-24x20	¾x¾-24x20	¾x¾-12x10	1x¾-8x6		
Reducers	Concentric & Eccentric	1x¾-24x20	1x¾-24x20		1x1-8x6		
Caps		¾"-24"	¾"-24"		1"-8"		
Stub Ends	Lap Joint	¾"-24"	¾"-24"				
Nipples	Shaped, 90° to Header	1¼"-12"	1¼"-12"				
Nipples	Shaped, 45° to Header	1¼"-12"	1¼"-12"				
Saddles		2"-24"					
Laterals	Straight	1¼"-24"	1¼"-24"				
Laterals	Reducing	1¼"-24"	1¼"-24"				
Crosses	Straight	¾"-24"	¾"-24"				
Rings	Welding	¾"-12"	¾"-12"				
Sleeves	Welding	2"-24"					

SUPER Tube-Turn 45° long radius elbows, 90° long radius elbows, and 180° long radius returns available in both Standard weight and Extra Strong in sizes from 3" to 12".

Tube-Turn welding fittings and flanges conform to applicable ASA and ASTM Standards. For further details please refer to Tube Turns catalog and data book No. 111.

*30" size short radius.

TUBE-TURN FORGED STEEL FLANGES—RANGE OF SIZES

	150 Lb.	300 Lb.	400 Lb.	600 Lb.	900 Lb.	1500 Lb.	2500 Lb.
Welding Neck	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-24"
Slip-On	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-24"
Lap Joint	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-24"
Threaded	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-24"
Blind	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-24"
Socket Type	¼"-24"	¼"- 4"		¼"-3½"			
Reducing-threaded or slip-on	¾"-24"	¾"-24"	¾"-24"	¾"-24"	¾"-24"	¾"-12"	¾"-12"
Orifice—threaded		1"-24"	4"-12"	4"-12"	3"-12"	1"-12"	
Orifice—slip-on		1"-24"	4"-12"	1"-12"	3"-12"	1"-12"	
Orifice—welding neck		1"-24"	1"-10"	1"-10"	1"-10"	1"-10"	
Long Welding Neck	1"-24"	1"-24"					

†Dimensions on sizes thru 3½" same as for 600 lb. flanges.
*Dimensions on sizes thru 2½" same as for 1500 lb. flanges.

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Oil-Well Pumping Practices—No. 2

Basic Principles of Reservoir Behavior

by J. Zaba

PART 2

Gas-Oil Ratios

RECOGNITION of the value and importance of conserving reservoir-gas energy preceded, by a considerable period of time, the era of intensive investigations of reservoir performance. Attempts to conserve gas were probably the first practical application of the principle of efficient utilization of natural forces available for moving oil from the reservoir to the well bore. Admittedly, the first attempts to conserve gas were, in majority of cases, concerned primarily with the role the gas plays in bringing oil from the bottom of the hole to the surface. In other words the main purpose was to prolong the flowing life of a well and postpone the economically less favorable period of mechanical lift. Nevertheless, they were steps in the right direction.

In the light of present knowledge of the mechanics of oil-reservoir behavior the necessity for conserving gas emerges as one of the primary conditions for efficient drainage of the reservoir. In gas-expansion reservoirs the energy of the compressed gas, free or dissolved, is the only energy available for moving the oil toward the well. Once this energy is exhausted, residual oil remains in the reservoir unrecoverable, unless existing conditions are such as to make feasible the application of secondary-recovery methods. As far as water-drive fields are concerned, a large number of them are producing in such a manner that hydrostatic pressure is not being fully utilized and the energy of the expanding gas is still the main oil-propulsive force. Consequently the considerations of gas-expansion reservoirs apply also to this type of production. Aside from pure energy considerations the effect of gas on the characteristics of the reservoir fluid and of the reservoir itself makes it desirable to prevent the gas from coming out of solution in the reservoir and entering the well in excessive quantities as a free gas.

In considering problems of wells with a large amount of free gas it should be realized that once given amounts of oil and gas enter the well bore they have to find their way to the surface. No control of gas-oil ratio can be therefore expected from changes in design of the flow string or from use of mechanical devices in the string. From the reservoir standpoint, the only factor which governs the entrance of oil and gas into the well bore is the differential pressure at the bottom of the well. Oil and gas having different flow characteristics respond differently to the same given differential pressure.[1] By changing this differential pressure, through changes of bottom-hole flowing pressure (production rate), the ratios of oil and gas entering the well under different sets of flowing conditions may be determined and thus, in many cases, the control of excessive gas ratios attained. Other methods of control such as selective acid treatment, squeeze cementing, production through deep tubing and positive gas shutoffs are all essentially based on the same principle, that of regulating the differential pressure across the face of the producing sand and among the different parts of the producing section.

In measuring the gas-oil ratios close attendance to details is essential. Conditions of equilibrium must be assured, the rate of production, at which the measurement was taken, must be stated. Precautions must be taken that all gas produced is being measured. To avoid confusion which quite often results from free use of term "gas-oil ratio" the term should be definitely qualified. Nomenclature has been suggested[2], the use of which would eliminate the possibility of wrong interpretation. The following terms, which are self-explanatory, have been suggested: formation gas-oil ratio, formation gas-liquid ratio, circulated gas-oil ratio, circulated gas-liquid ratio, gross gas-oil ratio, gross gas-liquid ratio, tubing gas-oil ratio, tubing gas-liquid ratio. The last two terms apply to pumping wells and should be used when no gas from the annulus is included in the measurement.

This is the second of a series of articles covering all phases of modern pumping operations. This series is particularly timely now that a falling discovery rate is requiring a greater output from pumping wells and the more rapid conversion of flowing wells to pumpers. Appearing weekly, it will begin next week the discussion of sucker-rod pumping systems commencing with the general concept of forces, motion, loads and measurement of loads in an ideal system. Next, the series will deal with the mechanical details of a system followed by a treatment of installation of a unit.

Water-Oil Ratios

Excessive amounts of water accompanying the production of oil were always an economic problem affecting, as they do, recovery and lifting power requirements and presenting a serious water-disposal problem. The industry was therefore always acutely conscious of this problem and numerous methods have been devised, and in many cases successfully applied, for combating the intrusion of water into the wells. Research of the past few years, however,[3,4] focused the attention on still another phase of the question. Detailed studies and mathematical analyses, particularly those of the behavior of the East Texas field, served to emphasize the fact that the energy of the reservoir water is fully as important as that of the reservoir gas and that there exists a need for conserving water as there exists a need for conserving gas if waste of oil is to be avoided.[5] This thesis does not appear to have as yet the wide practical application it actually deserves.

Productivity Index

The advantage and need for determining the productivity of a well, that is the well's ability to produce, are obvious. In the past this productivity was determined by different types of tests, ranging from open-flow tests to tests through tubing with chokes. With advent of proration these tests became of particular importance since, in the majority of cases, they furnished data from which the well's daily allowed production was determined. This fact put a premium on large well potentials encouraging well completions with large diameters of casing, excessive shooting of formations and, in the case of pumping wells, installation

of oversize pumping equipment which was unnecessary later when the well had to pump only its small allowable production. Under these conditions the potential test became more a test of the type and efficiency of the well equipment than of ability of the well to produce. Besides requiring large, unnecessary investment in well equipment such tests were in many cases actually injurious to the reservoir. A need for other means of determining the ability of a well to produce was therefore apparent.

T. V. Moore was first to suggest a method for determining the productivity of a well without open-flow test.[6] Since the only cause of the flow of oil from reservoir into the well bore is the difference between the reservoir pressure and the bottom-hole flowing pressure, then the number of units of fluid which flow in a given period of time from the reservoir into the well per unit of the differential pressure denote the true ability of reservoir to produce. Determined at the producing sand face, such a value, designated as productivity index, is independent of the properties of the flow string and of the surface well equipment. It expresses only the ease with which the fluid, under given conditions, can flow through the porous reservoir to the well bore, this ease being the resultant of the combined characteristics of the reservoir and of the fluid. In an extreme simplification of a complex theoretical problem the productivity index may be considered as a measure of the permeability of the reservoir.

The basic concept of the productivity index is simple but the factors involved make it highly complex. For a homogeneous fluid flowing through the reservoir in a viscous, radial flow under steady state conditions, the rate of flow would be proportional to the differential pressure. This may be expressed by the following equation:

$$Y = C(X - X_1)$$

where

Y = rate of flow

$X - X_1$ = differential pressure

C = constant of proportionality

The constant C, the slope of the line, would be the productivity index, which would be constant for different rates of production. The reservoir fluid, however, is not homogeneous. It is an oil-gas mixture, the characteristics of which change as the liberation of gas takes place. The characteristics of the reservoir itself change as a result of changes in saturation. The flow in the proximity of the well may change from viscous to turbulent. The productivity index is therefore a function not only of reservoir and fluid characteristics but also of oil-gas ratio, pressure differential, absolute reservoir pressure.[7] From a purely theoretical standpoint, therefore, the productivity index would not be expected to be constant for different rates of production, which would limit its practical usefulness.

Actual measurements, however, of the productivity index of a great number of wells showed that for moderate rates of production and for conditions of equilibrium such as can be attained under practical field conditions, linear relation does exist in a large number of cases, between rate of production and pressure differential. In many other cases deviation from this straight relation is well within the probable limits of error of measurements. Because of this fact the productivity index found wide practical application as a measure of the productivity of wells.

Definitions.—A number of different wordings of definitions of productivity index are in general usage. A few are given herewith:

Productivity index is defined as barrels per day of gross liquid produced per pound per square inch of pressure differential between static and flowing pressures at a specified subsurface datum, or

Productivity index is defined as barrels per day of gross liquid produced per pound per square inch pressure drop at the producing sand, or

Productivity index is sometimes referred to as rate of production per pound drop of bottom-hole pressure.

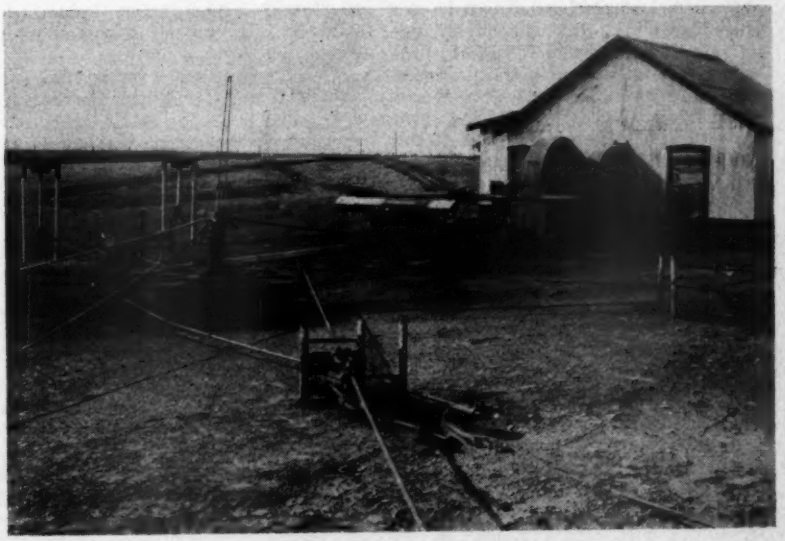
The production rate of the concept of productivity index is sometimes expressed in terms other than barrels per day.[8] Mass productivity index is defined as the mass fluid (pounds of oil, water and gas) produced per day per pound per square inch differential pressure.

For the purpose of comparison, to eliminate the factor of depth of penetration of the producing formation by different wells, a concept of specific productivity index has been introduced. Specific productivity index is the productivity index divided by the number of feet of the exposed formation.

Measurements. — The productivity index can be determined by actual measurements of pressure differential at different rates of production or, within certain limitations, by theoretical calculations.

Actual measurements of pressure differential can be accomplished either by use of subsurface pressure gages or by determining the fluid level through one of the available methods and calculating the pressures needed. The pressures needed are the static bottom-hole pressure and the bottom-hole flowing pressure at one or more rates of production. For instance in case of a well with a static bottom-hole pressure of 1,200 lb./in.^{2}, which, at a steady rate of production of 25 bbl. of fluid/hour, or 600 bbl./day, has a flowing bottom-hole pressure of 960 lb./in.^{2}, the productivity index would be 600/1,200-960 = 600/240 = 2.5 bbl. of fluid/day/lb./in.^{2} differential pressure. To use calculations of productivity index from two rates of production assume a well which, at settled rate of production of 400 bbl./day, has the flowing bottom-hole pressure of 700 lb./in.^{2} and at settled rate of production of 500 bbl./day has the flowing bottom-hole pressure of 550 lb./in.^{2} then the productivity index = 500-

(Continued on Page 50)



Central-power pumping installation in Kansas

Polymerization of Mixtures of Olefins and Diolefins in Presence of Metallic Sodium*

by V. N. L'vov†

IN a previous article on polymerization of mixtures of 1,3-butadiene with isobutene in the presence of metallic sodium,[1] it was shown that isobutene participates in the polymerization forming copolymers. From the products of polymerization, low molecular polymers were isolated (extent of polymerization 2-6) which consisted of products of addition of a single molecule of isobutene to several molecules of butadiene, the general formula of the compound being $(C_4H_6)_{n-1}\ C_4H_8$. A similar course of the reaction is indicated by the results of research on polymerization of mixtures of 1,3-butadiene with 2-butene in the presence of metallic sodium.[2,3]

The object of the present study on polymerization of mixtures of diolefins and olefins with metallic sodium was to determine whether other hydrocarbons, homologs of 1,3-butadiene, in mixture with olefins will undergo a similar course of reaction.

The experiments were carried out with two mixtures; one contained 1,3-butadiene and trimethylethylene and the other isoprene with isobutene. The selection of these mixtures was made not only for the primary purpose of this work, but also with the view of obtaining additional verification of the conclusions drawn in the preceding work. Mixtures of an olefin and a diolefin with different numbers of carbon atoms in the molecule could form simplest products of copolymerization greatly differing from the products of polymerization of the given olefin or diolefin separately (it is not impossible that these polymers are actually formed). Thus, polymerization of butadiene C_4H_6 in mixtures with pentene C_5H_{10} will give a product of copolymerization C_9H_{16} of molecular weight 124.1, differing sharply from the dimer of the diene C_8H_{12}, molecular weight 108.1, or that of the olefin $C_{10}H_{20}$, molecular weight 140.2.

To determine whether the olefin participates in the reaction its amount in the charge and that remaining unchanged after the reaction were determined. Simultaneously, the amount of "low polymer forms" among the products of polymerization was determined.

The experimental results shown in Tables 1 and 2 confirm the conclusions drawn from the study of polymerization of mixtures of 1,3-butadiene and isobutene. The olefin partly participates in the polymerization, and the amount of polymer exceeds that of the diolefin charged.

1. Polymerization of mixtures of 1,3-butadiene with trimethylethylene and of isoprene with isobutene in the presence of metallic sodium involves participation of the olefin in the formation of copolymers. The amount of reacted olefin increases with increase of its content in the mixture.

2. The reaction leads to formation of products of different extent of polymerization from which low polymers can be isolated. The amount of low polymers increases with rise of the content of the olefin in the mixture.

3. The simplest products of polymerization are formed by addition of 1 molecule of olefin to 1-2 diolefin molecules.

4. The polymerization of the investigated mixtures of hydrocarbons does not essentially differ from the polymerization of mixtures of 1,3-butadiene with butene in the presence of metallic sodium.

Detailed Investigation

Polymerization of these mixtures produced low molecular polymers which were isolated. Their amount increases with increase of the content of the olefin in the mixture. These low polymers were subjected to a detailed investigation. From mixtures of butadiene with trimethylethylene low polymers were obtained which were separated into two fractions, one boiling at 76°-79° and 120 mm. pressure and the other at 90°-95° and 20 mm. pressure. Their invesigation revealed that they did not constitute products of polymerization of any of the individual hydrocarbons used for the reaction. Their content of carbon and hydrogen corresponded to the composition of a mixture of 1,3-butadiene and trimethylethylene taken in definite proportions. The molecular weight of the polymers was not a multiple of the molecular weight of either 1,3-butadiene or pentene. Analysis, molecular weight and extent of unsaturation of these hydrocarbons indicated that they were products of copolymerization of 1,3-butadiene and trimethylethylene.

The fraction boiling at 76°-79° and

TABLE 1—Polymerization of Mixtures of 1,3-Butadiene and Trimethylethylene in the Presence of Metallic Sodium

Charged, per cent			Polymer, per cent on butadiene	Low molecular polymers, per cent on the polymer
Butadiene	Trimethylethylene	Sodium		
90.0	10.0	2.0	100.2	0.26
75.9	24.1	1.9	100.4	0.53
52.0	48.0	2.0	101.3	1.58
31.4	68.6	2.1	107.1	8.5
25.2	74.8	2.3	110.2	13.0
12.6	87.4	2.2	117.4	21.2

TABLE 2—Polymerization of Mixtures of Isoprene and Isobutene in the Presence of Metallic Sodium

Charger, per cent			Polymer, per cent on butadiene	Low molecular polymers, per cent on the polymer
Isoprene	Isobutene	Sodium		
90.2	9.8	3.7	103.2	3.23
75.8	24.2	2.7	102.6	3.84
49.9	50.1	2.7	110.8	11.1
23.1	76.9	3.4	114.2	15.6
10.4	89.6	2.4	116.9	15.9

*This translation is submitted by the Petroleum Division of the American Chemical Society through a courtesy arrangement with the Foreign Petroleum Literature Survey of Universal Oil Products Company. The facts and opinions presented are solely those of the authors cited in the references, and the Petroleum Division and Universal Oil Products Co. do not necessarily endorse the statements made.

†Synthetic Rubber Laboratory, Leningrad Institute of Chemical Technology. Kauchuk i Rezina (Synthetic Rubber), 1940, No. 7, pp. 16-19.

120 mm. consisted of the hydrocarbon C_9H_{16} with two double bonds which may be explained by formation of a straight chain hydrocarbon by addition of 1 molecule of trimethylethylene to 1 molecule butadiene. Ozonization of this hydrocarbon permitted no definite conclusion concerning its structure. Acetic acid, formic acid and a keto acid of undetermined structure, apparently $C_9H_{12}O_3$, were isolated from the products of ozonization. Formation of the hydrocarbon C_9H_{16} from 1,3-butadiene and trimethylethylene, as well as formation of acetic and formic acids, points to the possible existence of two hydrocarbons of the above composition,

$$CH_3CH=C(CH_3)CH_2CH_2CH_2CH=CH_2$$

and

$$CH_3CH=C(CH_3)CH_2CH(CH_3)CH=CH_2.$$

A mixture of these isomers can also be present.

The fraction boiling at 90°-95° and 20 mm. was shown by analytical data to be a hydrocarbon of the composition $C_{12}H_{20}$ containing three double bonds and formed by condensation of 1 molecule of pentene with 2 molecules of butadiene.

Low molecular products of polymerization of isoprene-isobutene mixtures have also been investigated. These polymers were similarly found to be products of copolymerization. According to analytical data the two lower fractions were hydrocarbons C_9H_{15} and $C_{14}H_{24}$, products of addition of 1 molecule of isobutene to 2-3 molecules of isoprene.

The higher fractions were investigated in less detail. However, the analytical data point to an assumption that these hydrocarbons were also formed by addition of 1 molecule isobutene to 3-4 molecules of isoprene.

EXPERIMENTAL PART

Initial Products

Butadiene was recovered from 1,3-butadiene tetrabromide melting at 116° with zinc shavings in aqueous alcohol. The recovered butadiene was kept over metallic sodium for several hours and distilled under a Davis column, the fraction boiling at from —4.5° to —4° being collected.

Trimethylethylene was prepared by dehydration of dimethylethylcarbinol obtained by a Grignard reaction from ethylmagnesium bromide and acetone. The dehydration was effected in the presence of oxalic acid[4] which was heated to 80°-85° before the alcohol was added to it in drops. The pentene was washed with water, kept over calcium chloride and then distilled. It was further boiled under a reflux condenser in contact with metallic sodium for several hours and redistilled under a six-bulb still head. The boiling point of the hydrocarbon was 37°-38°.

Isoprene was prepared by dehydration of dimethylvinylcarbinol over anhydrous magnesium sulfate at 250°. It was separated, dehydrated, dried over calcium chloride and distilled from metallic sodium, collecting the fraction boiling at 33°-36°. The crude isoprene was then freed of admixtures, mainly trimethylethylene, by forming its dihydrobromide by passing gaseous hydrogen bromide into its solution in glacial acetic acid. The obtained isoprene dihydrobromide was washed, dried and separated from amyl bromide by distillation. It boiled at 80°-82° and 23 mm. Isoprene was subsequently recovered from its dihydrobromide by heating with an excess of ground potassium hydroxide on an oil bath at 160°-165°[5] and distilled from metallic sodium under a still head at 33°-34° and 740 mm. Its d(20/4) was 0.6796, against 0.6803 given in the literature.[5] Analysis of two samples with maleic anhydride indicated a content of isoprene amounting to 99.8 in one case and 99.2 in the second.

Isobutene was prepared by dehydration of isobutyl alcohol at 450° over alumina. After heating over metallic sodium, isobutene was distilled under a Davis column at from —7° to —5°.

Polymerization

The experiments of polymerization were carried out with mixtures of butadiene and trimethylethylene and of isoprene with isobutene in which the contents of diolefin in the mixture were 10, 25, 50, 75 and 90 per cent, respectively. The total charge was 25 g. in all cases. The mixtures were polymerized at 20°-25° in glass ampules in an atmosphere of nitrogen in the presence of a sodium wire of 0.65 mm. diameter used in amounts of 2-3 per cent by weight on the mixture. The same characteristic phenomena were observed in polymerization of these mixtures of hydrocarbons which were previously noted in polymerization of 1,3-butadiene in mixture with isobutene. The solution became colored, the shades varying from yellow-orange to dark red. The intensity and the extent of coloration increased with rise of the content of the olefin in the mixture. The period of time elapsing before the polymerization set in and the total reaction period were longer with the increase of the amount of olefin present in the mixture.

The reaction products were analyzed for the content of the unreacted olefin 15 days after the apparent completion of polymerization, and the low molecular polymerization products were isolated. Isolation of the initial hydrocarbon and the low polymers was carried out by the method described in the previous study with slight modifications. Trimethylethylene was isolated from the product of polymerization under a pressure of 160-200 mm. produced with the aid of a water jet pump. Further reduction of the pressure was produced with the aid of an oil pump at 60°-70°. From the hydrocarbons condensed in the trap cooled with liquid air trimethylethylene was removed by evaporation under a pressure of 160-200 mm. The amount of condensate was determined by weighing the trap, the difference between the weight of the tube and the weight of the condensate being accepted as the weight of the evaporated trimethylethylene.

In some experiments trimethylethylene, distilled off the polymer, was fractionated under reduced pressure, using a Podbielniak microcolumn. These experiments showed that when trimethylethylene is removed under a pressure of 160-200 mm. only an insignificant amount of the low molecular product is lost by evaporation.

The products of polymerization of mixtures of isoprene with isobutene were treated in the same way as those obtained from 1,3-butadiene and isobutene. No unpolymerized isoprene was found in the distilled products. The results are shown in Tables 1 and 2.

Low Molecular Polymers

Mixtures of 1,3-butadiene with trimethylethylene.—The condensate removed from the trap cooled with liquid air and collected from several experiments was dried with metallic sodium (some resinification of the liquid occurs) and subjected to vacuum fractionation in a stream of nitrogen, giving the fractions shown in Table 3.

TABLE 3

Fraction	Boiling point, °C	Grams
1	73-75 (100 mm.)	7.20
2	to 70 20 mm.)	0.54
3	70-90 (20 mm.)	0.22
4	90-95 (20 mm.)	1.31

Fraction 1 was refractionated from metallic sodium under reduced pressure and was found to boil at 76°-79° and 120 mm. It was a colorless liquid of peculiar odor; d(0/4), 0.7675; d(20/4), 0.7512; molecular weight determined by the method of V. Meyer, 124.0, 124.6; calculated for C_9H_{16}, 124.13; n(20/D), 1.4367; MR_D, 43.13; calculated for C_9H_{16}, 42.83. Analysis found: C, 86.94 per cent, 86.73 per cent; H, 13.09 per cent, 12.99 per cent. Calculated for C_9H_{16}: C, 87.01 per cent; H, 12.99 per cent.

The extent of unsaturation was determined by hydrogenation over platinum black in ethyl alcohol at 10°. An 0.4053 g. sample absorbed in the presence of 0.12 g. platinum black 141.5 ml. hydrogen (0°, 760 mm.), against the calculated for C_9H_{16} with two double bonds amount of 146.5 ml.

This hydrocarbon gave a negative reaction for conjugated double bonds with an alcohol solution of sulfur dioxide. Consequently, the fraction 76°-79° and 120 mm. was a straight chain hydrocarbon C_9H_{16} with two double bonds.

(Continued on Page 50)

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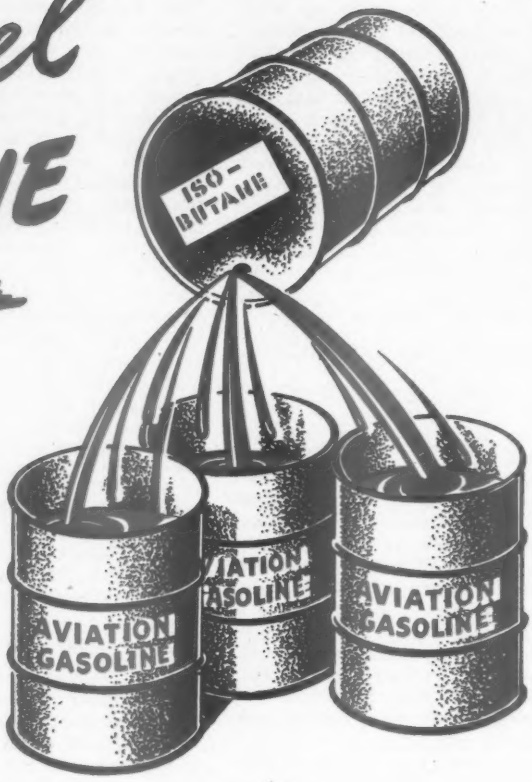

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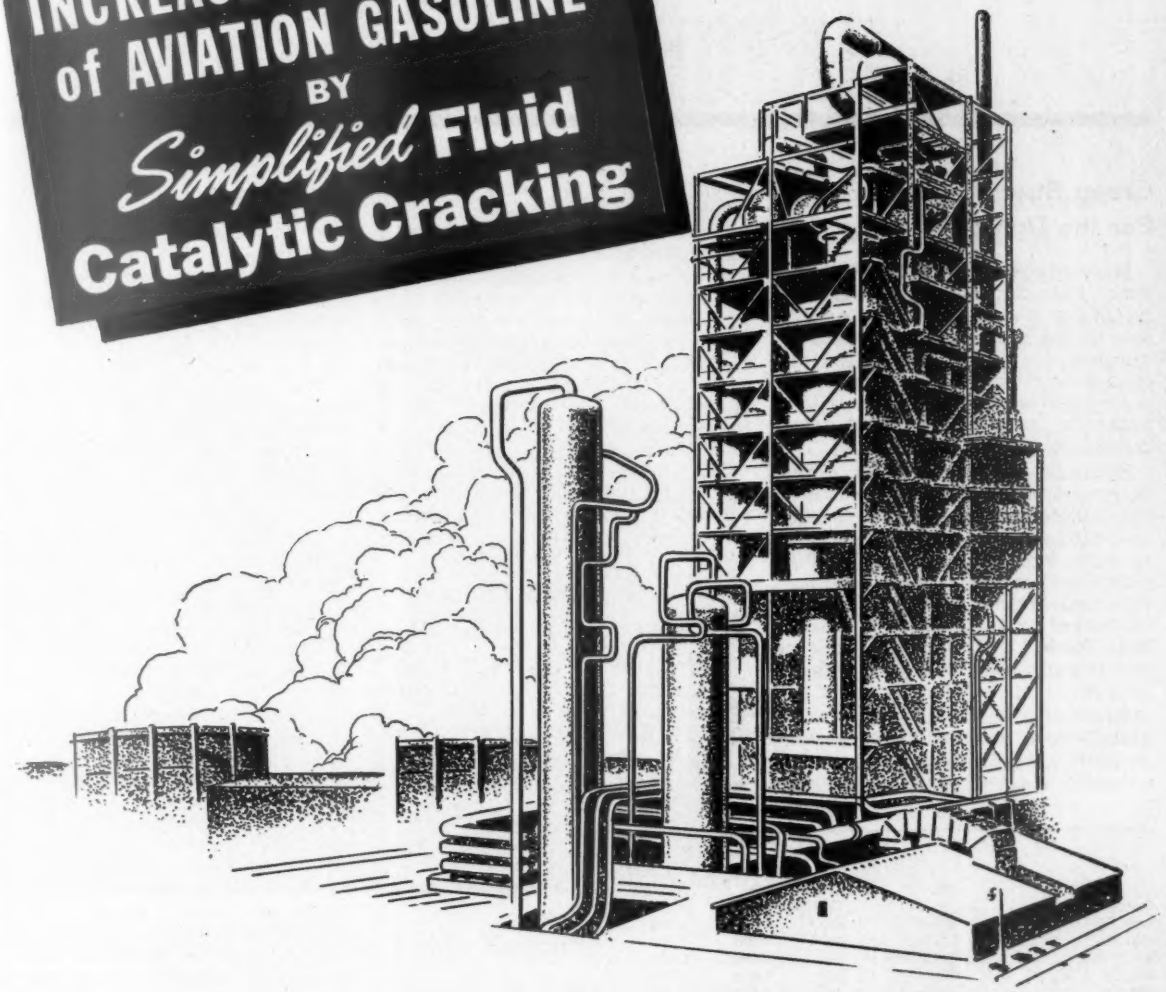

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PROGRESS IN METALS

by W. L. Nelson

Creep Strength For the Duration

Many equipments which have heretofore been designed for a long useful life of 5-15 years, should in the face of the grave national crises, be designed for the duration. This applies most directly to war plants and war equipments, but due to scarcities, might be extended to cover many civilian equipment.

Particular situations which might deserve attention, are parts which are subject to wear, to corrosion, to well-defined fatigue conditions, and to high temperature tube installations, such as those used in pipestills and boilers. The last idea was introduced by C. L. Clark in "Three-Year Steels," U.O.P. Library Bulletin of Abstracts, Vol. 18, No. 11, March 17, 1943.

Whereas pipestill tubes have frequently been designed for a 10-year service (or 1 per cent creep in 100,000 hours) it appears that a 3 per cent creep during 30,000 hours of service would result in large savings of alloy steels. Three per cent creep is selected as a limit because this deformation can be suffered providing rupture does not occur at a shorter time. Dr. Clark has prepared the useful tables of creep strengths shown on this page. One table shows the design strength for a creep of 3 per cent in 30,000 hours, and the other shows stresses that will cause rupture in 30,000 hours.

It is also believed by Dr. Clark that oxidation can be slowed down by the use of a larger amount of silicon than the amounts normally employed.

Low-Temperature Fatigue Of Steels

Abstract—M. Hempel and J. Luce, Arch. Eisenhuttenwesen Vol. 15, pp. 423-430, March 1942. Taken from Metals & Alloys, April 1943.

Smooth solid rods and specimens with annular pointed notch of two chromium-molybdenum steels, one chromium-nickel-molybdenum steel, and three unalloyed steels with 0.08, 0.40 and 0.64 per cent C were subjected to tension-compression alternating tests with different average tensions at plus 20, minus 78 and minus 188° C. (68°, —108°, —306° F.) by the Wohler method.

The results show that the Wohler lines for the same material do not change at a definite temperature for different average tensions and run practically parallel. A difference occurs only in the inclined part of the lines (toward the abscissa axis). The border lines have, in solid smooth rods, an almost parallel course with decreasing temperature and only a slight decrease of the deflections with increasing average tension, while in notched rods, the deflections decrease considerably with increasing average tension.

Alternating tests can be made on both solid and notched specimens at low temperatures up to much higher average tensions than at room temperature. Both fatigue strength and notch-fatigue strength increase with increasing tensile strength of the steels. The increase of fatigue strength of solid rods is especially noticeable in the temperature range from —78° to —180° C. (—108° to —306° F.). Notch sensitivity of the unalloyed steels increases appreciably with falling temperature, especially at —188° C. (—306° F.). Complete diagrams illustrate the results.

CREEP STRENGTH

Steel—	Stress for 3 per cent creep in 30,000 hours at—						
	900° F.	1,000° F.	1,100° F.	1,200° F.	1,300° F.	1,400° F.	1,500° F.
Carbon	16,900	5,750	1,800	620	.....	.....	.....
0.50 Mo	18,800	10,800	4,000	2,200	.....	.....	.....
DM	25,000	22,000	6,800	3,950	1,800	.....	.....
2 Cr Mo	19,300	8,900	6,000	3,500	.....	.....	.....
2¼ Cr 1 Mo	.....	11,000	7,400	4,450	.....	.....	.....
Sicromo 3M	.....	8,700	5,100	3,550	1,550	.....	.....
5 Cr Mo	15,250	10,100	5,850	2,800	1,950	.....	.....
5 Cr Mo + Ti	.....	12,000	.....	1,500	.....	.....	.....
Sicromo 5S	.....	8,700	4,800	2,900	1,450	.....	.....
Sicromo 5MS	.....	.....	6,000	3,650	1,800	.....	.....
Sicromo 7	.....	.....	3,900	2,500	1,350	.....	.....
Sicromo 7M	.....	.....	5,900	2,850	1,500	.....	.....
Sicromo 9M	.....	.....	6,200	2,650	1,500	.....	.....
18-8	.....	18,000	13,200	8,200	5,750	4,000	2,850
18-12 + Cb	.....	.....	21,000	5,300	2,000	.....	.....
16-13-3	.....	24,500	21,000	14,500	9,200	6,300	4,200

RUPTURE STRESS

Steel—	Stress for rupture in 30,000 hours at—						
	900° F.	1,000° F.	1,100° F.	1,200° F.	1,300° F.	1,400° F.	1,500° F.
Carbon	.....	3,600	.....	1,000	.....	.....	.....
0.50 Mo	.....	9,200	4,000	2,400	780	240	.....
DM	.....	19,500	9,000	3,000	1,000	.....	.....
2 Cr Mo	.....	12,500	7,600	3,800	1,400	.....	.....
2¼ Cr 1 Mo	.....	16,500	9,600	5,200	2,100	.....	.....
Sicromo 3M	.....	.....	7,200	4,400	2,700	.....	.....
5 Cr Mo	.....	16,000	7,800	3,750	2,000	.....	170
5 Cr Mo + Ti	.....	12,000	4,500	2,400	1,500	.....	.....
Sicromo 5S	.....	11,200	6,300	3,800	2,200	.....	590
Sicromo 5MS	.....	.....	8,000	4,650	2,650	.....	330
Sicromo 7	.....	.....	9,800	4,400	2,100	.....	360
Sicromo 7M	.....	.....	11,000	5,300	2,750	.....	500
Sicromo 9M	.....	.....	13,000	5,300	2,100	.....	540
27 Cr N	.....	.....	.....	2,300	.....	1,000	570
18-8	.....	.....	.....	8,400	4,400	3,500	2,100
18-12 + Cb	.....	.....	19,000	7,900	3,300	.....	.....
16-13-3	.....	.....	.....	15,000	10,500	5,400	2,400

Welding Terms

Welding Pressure

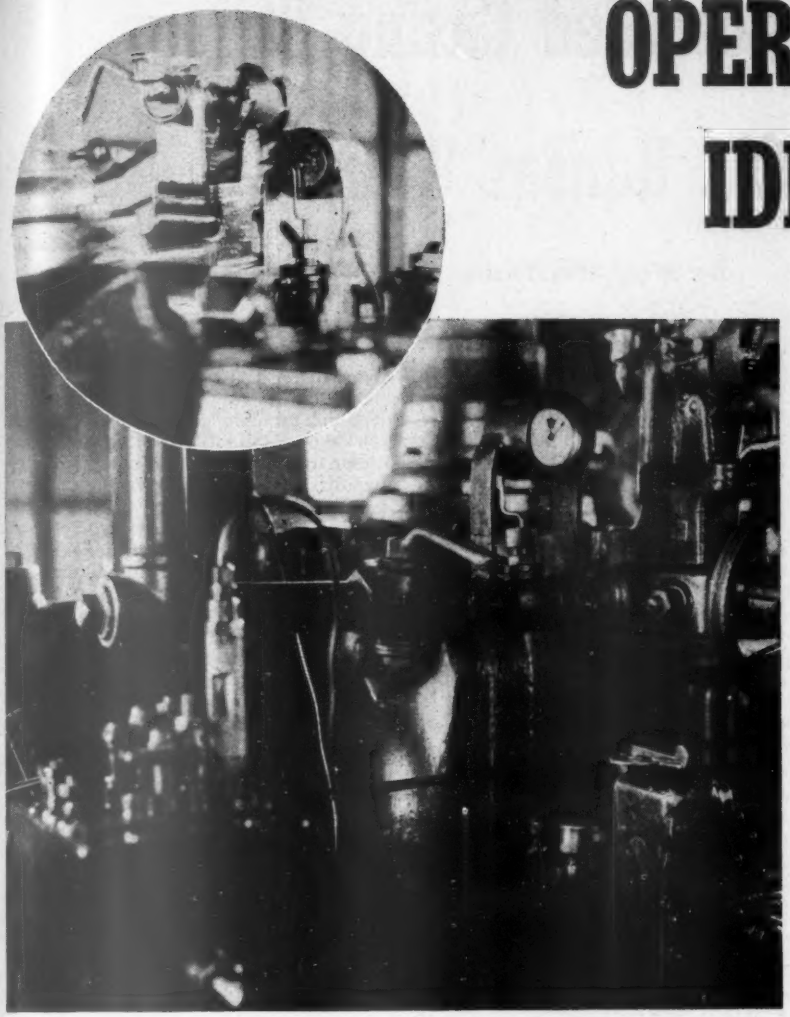
In the process of pressure welding, which is one type of electric welding, contact is established by pressing the two parts together. Thus, the welding pressure may be defined as external force applied in the pressure-welding processes to control the current density throughout the weld, or effects of fusion, or both.

Welding Grounds and Leads

This is defined by the American Welding Society as "the side of the circuit opposite the welding electrode."

The leads are the conductors furnishing an electrical path between source of welding power and the electrodes.

OPERATING IDEAS



Automatic Shutdown Device for Pump Engine

RECENTLY when a Seminole superintendent was unable to obtain the alarm-clock type commercial device for automatically shutting down pumping engines, he designed one utilizing a time bomb clock. Since this clock is comparatively small, the installation can be conveniently fitted in the gas line near the engine throttle.

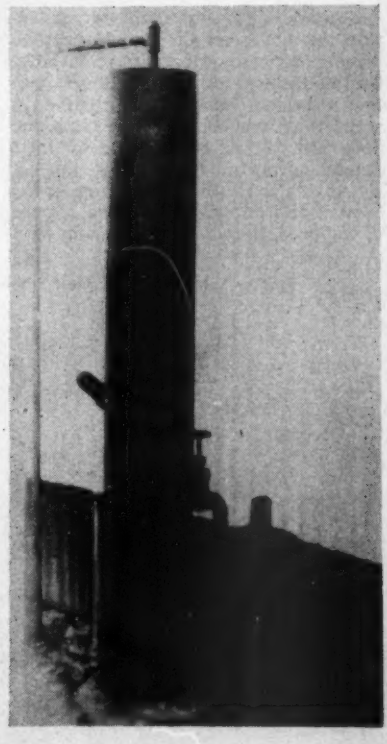
Shown here is one of these automatic shutoffs installed on an engine in the Seminole area. The frame holding the clock consists of two straps of steel welded to a short piece of 2-in. pipe. When the valve is installed in the line two all-thread nipples are used and these nipples also receive the lower two supports of the clock holder. Two set screws, visible in the photograph, minimize the possibility of the frame turning under engine vibration, which would cause either a strain on the valve stem or a premature closing off of the valve. The valve used in the line is the type which shuts off when the valve proper is in contact with the seat. This valve is spring-loaded so that it remains against the seat unless the extension is held up by the clock winder as shown in the circle.

All the pumper has to do is to set the clock each morning and place the valve extension on the clock winder. At the predetermined time the clock goes off and, as the winder turns, the valve extension slips off. The spring-loaded valve immediately snaps down upon the seat, closing off the gas supply to the engine. This valve was converted from a small globe-type valve.

At this particular time, when it is necessary to take advantage of all labor-saving devices, this automatic shutoff has important possibilities for permitting pumpers to handle a greater number of wells. In this particular case, for example, the saving in time ordinarily required for the pumper to make a trip back in the afternoon to shut the well down amounted to about 1½ hours.

Kerosene Wash Scrubber For Gas Engine Fuel

A SCRUBBER employing a kerosene wash has been installed on the fuel line to a gas engine in a salt-water disposal pumping plant in the Pauls Valley, Oklahoma, field. The kerosene wash insures a more effective removal of water or other impurities from the steel, and at the same time provides another important benefit in that the gas passing through the kerosene in the scrubber picks up some of the kerosene in the form of mist which acts as an engine-cylinder lubricant. The scrubber, shown in the accompanying picture, was fabricated from a section of 16-in. pipe. The gas enters through a baffled section in the bottom and then passes upward through a column of kerosene maintained at a level of approximately 18 in. The bottom is equipped with a water drawoff for removal of accumulations. Kerosene makeup is added through a side inlet connection.



Repair of Corroded Casing Strings In Old Kansas Wells

by Neil Williams

CASING failures due to action of corrosive waters present a major problem to Kansas operators. The problem involves not only remedial work in old wells to shut out extraneous water but also protection of pipe and prevention of corrosion in old and also new wells. The increasing number of casing failures that are beginning to show up is leading to greater consideration of corrective measures that might be undertaken. A main factor in this is the necessity for holding costs to a minimum.

Sources of the most corrosive water are the Arbuckle lime, the principal and deepest oil-producing horizon in the majority of fields of western Kansas, and the Dakota sand, a shallow horizon which has been unproductive of oil to date. Arbuckle water, produced with the oil, attacks the casing from within the well. Corrosion from water in the Dakota sand and other shallow formations results when this water acts on the casing from behind, causing leaks that permit the water to get into the well.

Corrosion by Arbuckle water inside the well can be controlled to a large extent by production methods. Casing failures due to Arbuckle water corrosion have been chiefly in wells that have been pumped up the hole with tubing and pumps set high enough to permit "skimming" the oil. By setting the tubing and pumps near bottom and pumping from the bottom of the hole, the amount of casing with which water comes in contact usually is small, since ordinarily oil fills the annular space behind the tubing above the pump intake. Few casing failures from Arbuckle water corrosion have occurred in wells that have been pumped from the bottom, and this is now general practice.

Some of the methods being followed by Kansas producers in repairing corroded casing in old wells are presented in this article. Protection of pipe being run in new wells against corrosive waters is another important phase of operations now receiving attention.

In most Arbuckle wells, the casing strings are cemented up approximately 400 ft. behind the pipe which generally would be above the setting of the pump intake and above the static level of the water. Corrosion of that portion of the pipe would not cause leaks.

In the case of wells pumping from the bottom, the water is lifted along with the oil as it comes into the hole. Small wells usually are not shut down long enough at a time or often enough for water to head up to static level. Large-capacity wells normally are not pumped down more than 400 ft. below static level and when shut down no more than 400 ft. of water would come into the casing. Many operators now follow the practice where possible of pumping wells at relatively low rates over longer periods of time. This tends to retard the ingress of water and minimizes heading up of water in the bottom of the casing, all of which serves to lessen the opportunity for casing corrosion from Arbuckle water.

When the pump intake is set high for pumping up the hole in "skimming," the water comes in contact with a much greater portion of the casing string. The corrosive action of the water then can result in leaks that will permit extraneous water to enter the well bore to be produced along with the Arbuckle water. Corrosion is accentuated by intermittent pumping with long shutdowns. Under such circumstances casing failures frequently result in less than 2 years.

Depth of Sand

Casing failures and leaks resulting from corrosive water in formations behind the pipe are a different matter and may occur at any point. Depth of the Dakota sand, the source of the most corrosive water, ranges from about 300 ft. to around 1,000 ft. depending on the area in which found. Breaking into the annulus behind the casing, this water may find its way down the hole even to the extent of filling the annular space. Relatively little trouble has developed so far from this source in wells having surface casing set and cemented through the Dakota sand, and most wells drilled within the last 5 or 6 years have been protected in this way. The majority of these wells have been drilled with rotary tools using rotary mud to close the face of the water sand while drilling and then with casing run pumping sufficient cement to fill the annular space to the top. Should this string not be cemented to the top there might be sufficient mud left in the hole to provide an adequate seal although it has been found that the mud sometimes settles exposing the water sand to the

Pulling unit on Kansas well preparatory to making casing repair job

Mixing Aquagel for full-string cementing job on Kansas well

pipe, thus offering opportunity for the water to corrode the surface string and break in around behind the oil string. Consequently, it is considered safer to cement the surface string to the top, which now is general practice.

In wells that were drilled prior to comparatively recent years casing failures have been particularly extensive. This may be due partly to the greater age of these wells giving more time for corrosion to act, and the full effect of this action may just now be showing up. However, most of these wells were drilled with cable tools or by ineffective rotary methods, in which adequate protection against intrusion of the shallow sand water was not provided.

A factor in Dakota water intrusion is that the flow in many areas is artesian which requires extra precautions to insure a shutoff. This makes it difficult for ordinary rotary mud to provide the necessary protection. This has been indicated by the fact that in abandoned cable-tool holes which were mudded outside the pipe the mud has settled and the hole filled with Dakota water, leaving the casing to become corroded.

First evidence of casing failures and leaks ordinarily is given by abnormally rapid increase in water production of a well. Whether this is from extraneous sources through leaks in the casing or from the producing horizon is easily determined by chemical analyses. Some operators make frequent analyses of the water production and detect the infiltration of extraneous water even before it is indicated by an increase in output.

Several methods are followed to confirm the presence or location of leaks in casing. One consideration in this is to determine whether the top water is entering through actual leaks in the casing or around the bottom of the casing as a result of poor cement jobs. The most common method is to pump down a test plug. Leaks will be evident if it is impossible to build up pump pressure. This method proves only whether the casing leaks but usually is adequate when it is desired only to run a tubing packer in the lower part of the casing to keep top water out of the bottom. In this practice, which is the most common method in old wells with badly leaking casing, the packer is set at the bottom, sealing off the annular space behind the tubing. The leaks in the pipe are not plugged, but with the annular space above the packer filled with oil the outside of the tubing and the inside of the casing are protected from further corrosion. The principal objection to setting tubing packers on the bottom is that they sometimes stick and interfere with pulling of tubing.

Locating Breaks

When it is desired to cement the leaks and other breaks it is first necessary to locate them. One method for this is to run a hook-wall packer, setting it at successive depths down the hole and pumping from above and below until the leaking sections of the casing are found. With the exact locations of the leaks determined a cementing tool or packer then can be run at the desired levels and the holes squeezed similar to squeeze jobs in perforated casing. Packers usually are of a retrievable type to eliminate the need of drilling them out.

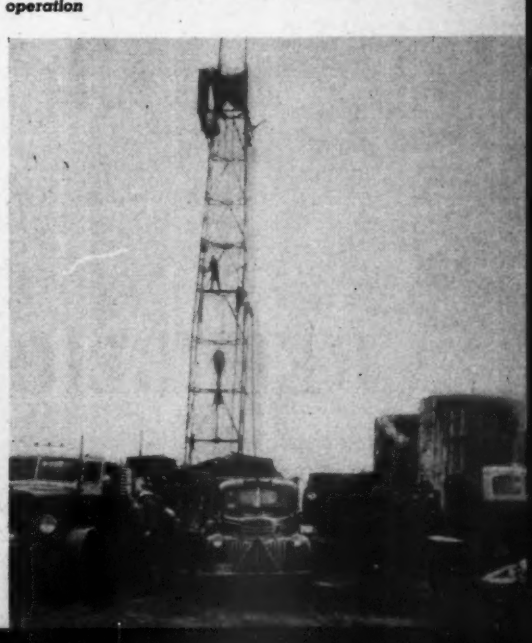
Squeeze cementing jobs have been undertaken in quite a few wells with a fairly high percentage of success. Through perforations above and below leaking sections sufficient cement is squeezed behind the pipe to fill the annular space through the section and for some distance above and below, providing not only a water shutout but also a protective encasement behind the pipe. Squeeze jobs also have been resorted to frequently to get cement behind the pipe through the Dakota sand in wells in which surface casing was not set and cemented through that formation.

In a number of repair jobs involving badly corroded old casing, operators have found it advisable to run entirely new strings of pipe. In some of these cases the old string has been pulled with some profitable salvage. In others, however, the old casing has been in such bad shape that it has been left in the hole and smaller strings run on the inside. Most of the older wells in Kansas were completed with 7-in. oil strings, which has permitted the running of 5½-in. strings on the inside. Although a new string of pipe is particularly effective in repairing a well, the cost in many cases might not be justified and at this time might be prohibitive in view of the scarcity of materials. Newer Kansas wells, however, usually have been completed with 5½-in. casing.

Use of liner run to a point above top leaks and set with packer has been successful in a number of wells. This procedure, however, ordinarily has been an expedient measure due to an unsuccessful squeeze job. In a few instances short strings of 5½-in. casing have been set with packer inside 7-in. casing.

In view of the corrosive action of outside water on casing, particular attention now is being given to protecting new strings and preventing corrosion. This has led one major company to attempt cementing of oil strings in new wells from bottom to top. The attempt has been made in a number of wells in several different areas. So far considerable difficulty has been experienced in getting the cement to the top due to formations taking the cement, and in only two wells has the operation been successful out of about six in which the project has been tried. In several wells with casing at approximately 4,200 ft. as much as 1,200 sacks of cement were pumped into the well without getting circulation. Temperature surveys indicated the top of the cement about 1,800 ft. from the surface although the amount pumped was more than sufficient under normal conditions to fill the annulus. Experimentation is under way with various possible admixtures and types of cement that will prevent loss of circulation.

Some of the battery of bulk cementing trucks on Kansas full-string casing cementing operation



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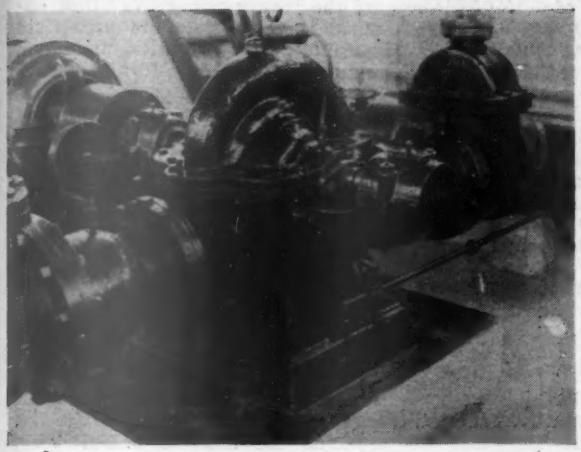


Cup Grease Seal for Centrifugal Pump Stuffing Boxes

IN most centrifugal pumps the stuffing boxes on each side of the pump case through which the impeller shaft rotates have spacer rings inserted at their mid points into which a small stream of fluid is injected under pressure to lubricate the packing and to provide a liquid seal. The injection is by means of a small line connection from the top of the pump case, the fluid being the product being handled by the pump and the pressure being supplied by centrifugal force of the impeller. The accompanying picture shows how this fluid seal on centrifugal pumps in one large plant has been replaced with a grease seal, which has proved still more effective. The small pressure lines were removed and the opening from the top of the pump case was plugged. The openings into the spacing rings in the stuffing boxes were fitted with pressure grease-gun connections, through which cup grease is forced with an ordinary hand-operated grease gun as needed.

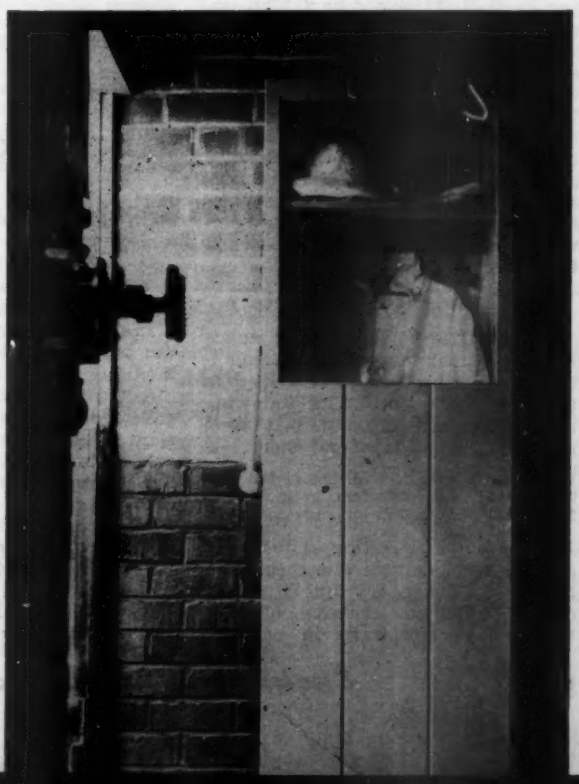
Rebalancing Turbine Rotor Wheels

AFTER reblading steam turbine rotor wheels, as is done as a routine maintenance job in Pan American Refining Corp.'s plant at Texas City, Tex., the wheel must be rebalanced before it is reinstalled in the turbine jacket. This job is accomplished as follows: Two strong upright supports are fitted with ball-bearing overlapping wheels, the uprights being based on heavy horizontal rods sliding through holes in their bases fitted with set screws the distance between these supports may be adjusted rigidly. The rotor wheel to be balanced is fitted to a temporary shaft, the ends of which are supported across the overlapping wheels at the top of each support frame. Standing near the rotor wheel and turning it by hand to determine its points of unbalance, an experienced workman with a hand grinder grinds off metal from the wheel at various points until it is nicely balanced and comes to a

rest at any point after being turned. This balance stand is so sensitive that a 5-cent piece placed on one of the blades on its periphery gradually turns the wheel until the coin is at the bottom of the circle. A rotor composed of several of these wheels is in static balance when assembled, if each wheel has been balanced separately.

Sealed Cabinet Protects Fire-Fighting Clothes

TO protect asbestos fire-fighting clothes against damage and soiling by water, dirt or oil when not in use and yet have them handy in case of an emergency, one large refinery has devised a small, doorless cabinet, built into the wall of the room. The front of the cabinet has a glazed sash, large enough to permit removal of the garments when the glass is broken. The coat and trousers hang on an accessible hanger below a shelf, on which the hat, gloves and shoes are kept. A wooden mallet is suspended at the side for breaking the glass.



Polymerizing Mixtures of Olefins and Diolefins

(Continued from Page 39)

The Fraction 4 boiling at 90-95 mm. under 20 mm. pressure was a colorless liquid of faint odor, d(0/4) 0.8053, d(20/4) 0.7903, molecular weight determined cryoscopically in benzene, 180.0, 175.4; calculated for $C_{12}H_{22}$, 178.2; n(20/D), 1.458; MR_D, 61.23; calculated, 60.83. Analysis found: C, 87.57 per cent; H, 12.71 per cent. Calculated for $C_{12}H_{22}$: C, 87.55 per cent; H, 12.45 per cent. The extent of unsaturation was determined by hydrogenation of a sample of 0.3516 g. of the compound in ethyl alcohol in the presence of 0.12 g. platinum black, under which conditions it absorbed 131.7 ml. hydrogen (16.5°, 774 mm.) Calculated for $C_{12}H_{22}$ with three double bonds, 138.1 ml. Consequently, the compound under investigation was a straight chain hydrocarbon with three double bonds.

Mixtures of isoprene with isobutene.—The condensate collected from several experiments was kept over metallic sodium and then fractionated under reduced pressure in a stream of nitrogen. The basic fraction boiled at 83°-85° under 110 mm. pressure and amounted to 3.13 g. The residue, amounting to 0.7 g. was not further investigated.

The fraction 83°-85° and 110 mm. had a d(0/4) 0.7760, d(20/4) 0.7603, molecular weight determined by the method of V. Meyer 127.3, 126.0. Calculated for C_9H_{18}, 124.1; n(20/D), 1.448; MR_D, 43.70. Calculated, 42.82. Analysis found: C, 87.15 per cent; 87.29 per cent; H, 13.04 per cent, 12.88 per cent. Calculated for C_9H_{18}: C, 87.01 per cent; H, 12.99 per cent. The degree of unsaturation was determined by hydrogenating a sample of 0.5945 g. of the substance in ethyl alcohol in the presence of 0.1 g. platinum black. The sample absorbed 211.7 ml. hydrogen (0°, 760 mm.), against the calculated 214.6 ml. The substance gave a negative reaction for conjugated double bonds. Thus, the fraction 83°-85° and 110 mm. pressure was a straight chain hydrocarbon C_9H_{18} with two double bonds.

Intermediate Polymers

Intermediate polymers were isolated from their solution in alcohol-benzene by the method described in the previous study. The following basic fractions were obtained upon vacuum distillation of polymers:

1—101°-105° under 20 mm. press., 1.30 g.
2— 65°- 75° under 0.02 mm. press., 1.52 g.
3—120°-130° under 0.02 mm. press., 0.91 g.

The Fraction 1 boiling at 101°-105° and 20 mm. pressure was a colorless liquid of faint odor; d(0/4), 0.8298; d(20/4), 0.8152; molecular weight determined cryoscopically in benzene, 184.6; calculated for $C_{14}H_{24}$, 192.2; n(20/D), 1.4716; MR_D, 65.48; calculated 65.45. Analysis found: C, 87.70 per cent; H, 12.55 per cent. Calculated for $C_{14}H_{24}$: C, 87.41 per cent; H, 12.59 per cent. Hydrogenation of 0.2917 g. of the substance in the presence of 0.11 g. platinum black in ethyl alcohol resulted in absorption of 103.1 ml. hydrogen (15°, 759.2 mm.), against calculated, 107.7 ml. for $C_{14}H_{24}$ with three double bonds.

The fraction 65°-75° and 0.02 mm. was a colorless liquid of d(0/4) 0.8405, d(20/4) 0.8263, n(20/D) 1.4780. Analysis found: C, 87.64 per cent; H, 12.79 per cent. Calculated for $C_{10}H_{22}$: C, 87.60 per cent; H, 12.40 per cent.

Fraction 120°-130° and 0.02 mm. was also a colorless liquid. Its d(0/4) was 0.8613 and its d(20/4) 0.8488; molecular weight (cryoscopically in benzene), 319.8, 341.0; calculated for $C_{24}H_{40}$, 328.3; n(20/D), 1.4878; MR_D, 111.4; calculated 110.7. No hydrogenation or elementary analysis of this fraction were carried out because of the small amount of the substance available.

Conclusions

The data obtained in the investigation of the three fractions showed that the fraction 101°-105° and 20 mm. may consist of a hydrocarbon $C_{14}H_{24}$; fraction 65°-75° and 0.02 mm., of $C_{10}H_{22}$, and, finally, the fraction 120°-130° and 0.02 mm., of a hydrocarbon $C_{24}H_{40}$.

REFERENCES

1. V. N. L'vov, Zhurnal Obshchei Khimii (J. Gen. Chem) 7, 928, 1937, Survey For. Petrol. Liter. S-93.
2. I. V. Rakityanskii and M. Yu. Lekakh, Sinteticheskii Kauchuk (Synthetic Rubber) 1936, No. 9, pp. 6-12.
3. B. A. Matusov, Polymerization of mixtures of 1,3-butadiene with 2-butene in the presence of metallic sodium. Dissertation, Leningrad Inst. Chem. Techn.
4. Kahlbaum, Germ. Pat. 66,866.
5. S. V. Lebedev, Research on polymerization of diolefin hydrocarbons, 1913, p. 72.
6. Vorlaender, Z. anal. Chem. 77, 24, 1929.

Basic Principles of Reservoir Behavior

(Continued from Page 37)

400/700-550 = 0.66 bbl./day/lb./in.^{2} drop in bottom-hole pressure.

In making direct measurements, for the purpose of determining the productivity factor, attention should be directed toward the accuracy of data collected. For instance measuring the fluid level in a tank to determine the rate of production, may lead to serious errors, because of the small amounts of fluid involved, unless extreme accuracy is assured.

Mathematical calculations of productivity index from available data on reservoir and fluid under reservoir conditions have been evolved and discussed by H. H. Evinger and Morris Muskat,[7] Emory Kemler and G. A. Poole[8] and James A. Lewis, William L. Horner and Marion Stekoll.[9]

Drawdown Tests

The proportionality of production, at moderate rates, to the height of fluid level,, is finding its practical utilization in determining the productivity of the wells through the so-called "drawdown tests." The measured fluid levels are plotted against their respective rates of production and the "drawdown curve" thus obtained is extrapolated to zero fluid level indicating theoretical maximum output. This procedure furnishes comparative data for the purpose of allocating allowable production of wells.[10,11]

A Pumping Well

A well may have to be pumped from the initial stages of its life or it may have a flowing life followed by a period of mechanical lift. The need for pumping is not necessarily a result of the low bottom-hole pressure. A well may have a high shut-in pressure but low productivity index in which case pumping would be resorted to to increase the pressure differential across the face of the sand by reducing the fluid level. Primarily, however, the purpose of pumping is to lift mechanically the fluid from the bottom of the well to the surface. The need for pumping occurs as result of the lack of gas energy to lift the fluid or as a result of an increased weight of fluid to be lifted because of increase of water content.

Bibliography

1. R. J. Sullivan, "Gas-Oil Ratio Control in Flowing Wells," Am. Petr. Inst. Drilling and Production Practice, 1937, p. 103.
2. B. P. Kantzer and E. G. Trostel, "Oil Well Performance: A Discussion and Proposed Terminology," Am. Petr. Inst. Drilling and Production Practice, 1937, p. 118.
3. Ralph J. Schiltuis and William Hurst, "Variations in Reservoir Pressure in the East Texas Field," Trans. A.I.M.E., 1935, p. 164.
4. Stuart E. Buckley, "The Pressure Production Relationship in the East Texas Field," Am. Petr. Inst. Drilling and Production Practice, 1938, p. 140.
5. T. V. Moore, "A Review of the Principles of Oil-Reservoir Performance," Am. Petr. Inst. Drilling and Production Practice, 1940, p. 97.
6. T. V. Moore, Am. Petr. Inst. Prod. Bulletin 206, 1930.
7. H. H. Evinger and M. Muskat, "Calculations of Theoretical Productivity Factor," Trans. A.I.M.E., 1942, p. 126.
8. Emory Kemler and G. A. Poole, "A Preliminary Investigation of Flowing Wells," Am. Petr. Inst. Drilling and Production Practice, 1936, p. 140.
9. J. A. Lewis, W. L. Horner and M. Stekoll, "Productivity Index and Measurable Reservoir Characteristics," A.I.M.E. Petr. Tech., March 1942.
10. J. Daviss Collett, Jr., "Application and Value of Drawdown Tests on Oil Wells," Am. Petr. Inst. Paper 901-18-C, Feb. 1942.
11. Neil Williams, "Kansas Drawdown Productivity Tests Cut Well Costs and Equipment Needs," The Oil and Gas Journal, Jan. 7, 1943, p. 119.

DETERMINING COST OF GAS LIFT

GAS lift is one of the methods of production which can now be used over the entire range of types of producing properties. At the present time this method is being used in a number of fields to produce the wells to depletion, or abandonment, and there are few companies that somewhere in their operations are not using gas lift to some extent.

Determining and controlling the cost of gas-lift operations are essentially the same as for other lifting methods. However, the records and methods have to be adjusted to take care of the different details. The objectives remain the same, the comparison of the cost of a particular gas-lift operation with other production methods, with different types of gas lift and with the same type of gas lift on similar properties.

Unfortunately, a producing property has only one life and conditions and operating cost differ at the various stages of that life. The nearest approach to a direct comparison of gas lift with other methods would be on a large lease where some of the wells could be produced in one manner and some in another. The same applies for comparing the different types of gas lift. Comparison of a large number of operations of one type with a similar number of a different type is also useful.

There are now several types of gas lift which can be grouped into two major classes according to functions, or to types of wells on which each is used. The first is the high-capacity well installation or the flow-valve system and the second is the medium or low-capacity well which uses the intermittent system. Essentially the same cost factors apply to both although the latter, because it utilizes more equipment, will have a larger number of details to be considered.

The principal point of difference in this and other lifting methods is the cost of the gas used to operate the lift. There is no charge for fuel or for electric current as none is used. The cost of the gas varies widely, depending on its source which may be from the same or another well, from a commercial gas company, from a gasoline plant or from the operator's own compression plant. The cost of this item may vary from zero to several cents per 1,000 cu. ft.

The investment charges may also vary considerably among different types of gas-lift operations and between this and other means of lifting. The cost of additional well equipment (in excess of the casing and tubing in the well) may run from less than $300 to as much as $1,500. The gas gathering and the high-pressure well-supply system must also be added to the total investment. If a compression plant is operated, its investment and maintenance cost must also be included.

Other expense headings remain practically the same as for pumping although the charges may vary widely. These include labor, maintenance and repair, pulling expense, loss of production through down time, treating, insurance, taxes and overhead. The four last named would be approximately the same for any production method but the first four show a wide variation with different types of lifting medium.

The engineer, or operating supervisor, can set up a sheet with headings for each of the above and can obtain all of the charges except one through the regular channels. The one exception is the detailed report of the maintenance and repair charges and this must be separately collected.

Because of the variation in gas-lift systems, no one list of headings and no standard form is completely applicable for gathering data on the cost of the items coming under repair and maintenance. However, that for the intermittent gas-lift system becomes the most nearly general and is shown in Table 1. For an open or closed type of straight gas lift or flow-valve system, many of the headings would be unnecessary. One would have only the repair and maintenance charges for the flow valves.

However, both for this type operation and for the intermittent system which uses pressure-operated valves, it would be desirable to have other headings for breaking down the cost of the various parts of the valves, etc., so that the main sources of expense could be recognized.

The accompanying table shows the record for the repair and maintenance of the equipment on one group of gas-lift wells for five semiannual periods as obtained from monthly records of the individual wells and leases. By using monthly records which can be utilized for compiling a summary, the work of the engineer is greatly simplified. The individual monthly records also aid in showing when there is a possible fault in the system which could be eliminated.

The semiannual summary shows over the entire range of operation the items which are the most costly or which are increasing from period to period and which should, therefore, have attention. No one period can be taken as the criterion but the trend must be established.

In the general summary of the cost of the operation, all the factors bear watching, but the one which particularly comes under the province of the engineer is the total charge for gas. Labor, pulling expense and production loss cannot be disregarded but generally anything out of line in any of these will be noticed quickly.

Where the gas is expensive, say $0.025 to $0.03 per 1,000 cu. ft., the lifting gas-oil ratio must be watched closely and must be kept as low as possible. It may be necessary to change a continuous operation to an intermittent one, or an intermittent volume-control system to a time-control system in order to conserve gas.

All figures should be reduced to the cost per barrel as in analyzing any other production arrangement as the cost per well per day affords no comparison when one well may be making 55 bbl. and the other 5 bbl.

TABLE 1—Repair and Maintenance Cost of Gas-Lift Equipment

	1940	1941		1942	
From—to:	July-Dec.	Jan.-June	July-Dec.	Jan.-June	June-Dec.
Number of wells	121	134	149	205	214
Hoist and motor	$19.20	$33.40	$15.05	$40.00	$79.52
Intermitter	185.16	459.90	362.85	327.49	511.85
Unloading-valve repairs	76.00	205.00	365.15	135.00	557.75
Footage meter	.....	.....	15.00	.....	.....
Clock	101.40	4.00	36.00	132.40	276.00
Weight cylinder	.....	.....	2.70	13.50	13.20
Wire line	.....	.....	.....	.....	60.00
Bottom-hole valve repairs	.....	113.20	227.90	296.74	237.82
Total repairs	$381.26	$815.50	$912.95	$949.93	$1,682.17
Average cost per well per day	0.0124	0.0335	0.0326	0.0244	0.0418
Average cost per barrel	0.00063	0.00181	0.00182	0.00128	0.00228

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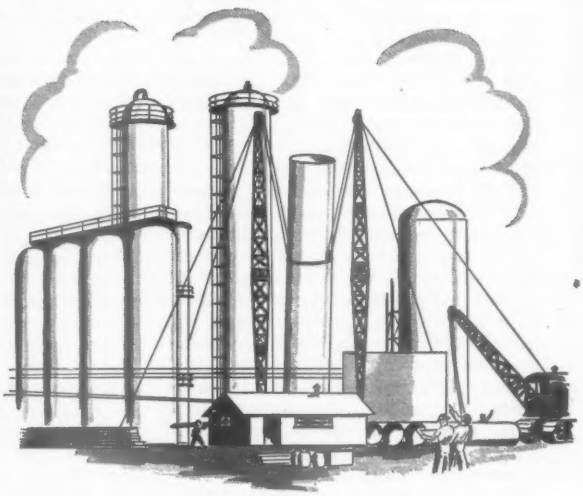

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CONTROL OF PUMP REPAIR COST

IN recent cost-engineering articles, problems dealing with the control of pump-repair costs were based on the assumption that detailed cost figures would be available to the engineers responsible for the economy of this phase of operation.

Not all companies maintain well-trouble cost-accounting systems and it becomes the responsibility of the engineer to devise a system of his own which will enable him to keep watch over pump-operating cost without devoting too much of his time posting records.

Most field offices maintain a record of pulling jobs which may contain no more detail than the date, kind of job (whether pump, rod, tubing, etc.) and a brief remark as to the repair material used. Table 1 shows the manner in which the information contained on the foreman's report may be maintained by the district engineer. Mimeographed forms of this kind were prepared by one district engineer in a hard pumping area and the sheets set up in a notebook, one for each well. Only a small amount of time was required each day to keep the record up to date. While no costs are shown it is possible to spot high-cost pump repair wells by the frequency of the pulling jobs.

When cost comparisons are made, or when the engineer must discuss a proposed change in pump installation in terms of costs, it is necesasry to make estimates of the pulling cost based on time required and number of men used on a crew. In cases of this kind, where cost records are totally lacking or inadequate, the engineer often finds it difficult to bear his recommendations out with a comprehensive report; although in his own mind the approximate economics of a particular problem may be perfectly clear.

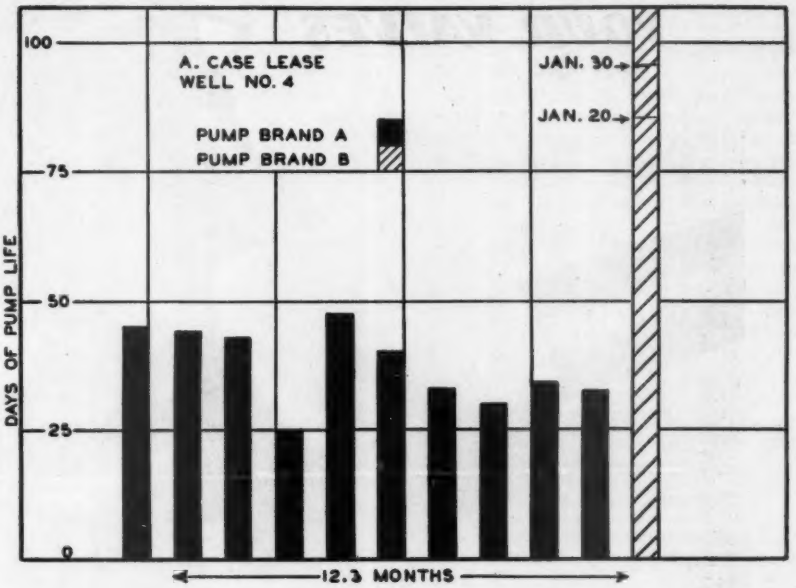


Fig. 1

Analysis of Well Operation

Where records and cost figures are not available it is necessary for the engineer to carry on investigations in the field, rather than the office where records of pulling jobs are too brief for making a complete analysis. Therefore, he must be present at the well (which appears to have a high pump-repair cost) when it is pulled. Since the records in the office carry no detail as to the reason for previous pump failures, his discussion with the pulling crew will have an important bearing upon the recommendations he makes for reducing pump-repair cost. In previous articles the other data which must be given careful consideration has been discussed. This, in addition to the information gained by an actual inspection of the damaged pump parts, should enable the engineer to present his recommendations in the form of a report to the district superintendent.

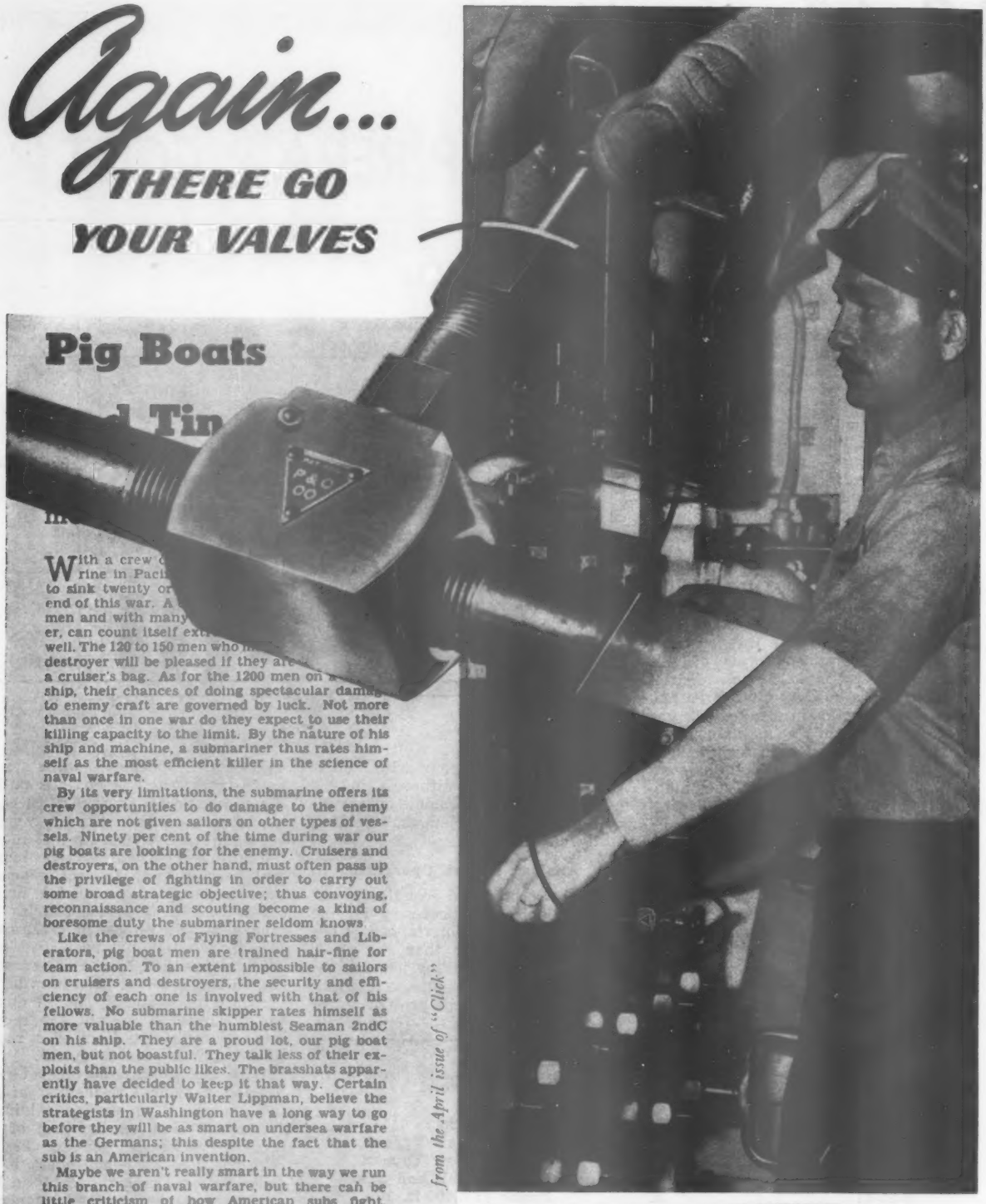
With the present shortage of engineering personnel, a method of follow-up which requires a minimum amount of time on the part of the engineer must be devised. Fig. 1, which is a rough pencil chart, is the type of record maintained by an Illinois engineer on the performance of a pump which was recommended after a thorough investigation of the short pump runs depicted by the chart. At intervals the additional days of pump service obtained by the new pump has been noted by a pencil extension of the chart. While cost figures are lacking, a record of this kind indicates whether a new pump installation will pay out.

TABLE 1—WELL TROUBLE

Lease — A. Case — Well No. 1

Date—	Kind of Job — P	R	T	Remarks
1-10-41	X			Installed New Type X
6-12-41	X			Installed New Type X
8-20-41	X			Installed Ball and Seat
8-25-41		X		Break at 3,500-ft. Box
11- 4-42	X			Installed New Type Y
12- 7-42	X			Installed New Type Z
12-18-42			X	Thread Leak
1-28-43	X			Installed New Type X

Again... THERE GO YOUR VALVES



Pig Boats

...d Tin...

...ith a crew ...rine in Pacif... to sink twenty or... end of this war. A... men and with many... er, can count itself extr... well. The 120 to 150 men who m... destroyer will be pleased if they are... a cruiser's bag. As for the 1200 men on a... ship, their chances of doing spectacular damag... to enemy craft are governed by luck. Not more than once in one war do they expect to use their killing capacity to the limit. By the nature of his ship and machine, a submariner thus rates himself as the most efficient killer in the science of naval warfare.

By its very limitations, the submarine offers its crew opportunities to do damage to the enemy which are not given sailors on other types of vessels. Ninety per cent of the time during war our pig boats are looking for the enemy. Cruisers and destroyers, on the other hand, must often pass up the privilege of fighting in order to carry out some broad strategic objective; thus convoying, reconnaissance and scouting become a kind of boresome duty the submariner seldom knows.

Like the crews of Flying Fortresses and Liberators, pig boat men are trained hair-fine for team action. To an extent impossible to sailors on cruisers and destroyers, the security and efficiency of each one is involved with that of his fellows. No submarine skipper rates himself as more valuable than the humblest Seaman 2ndC on his ship. They are a proud lot, our pig boat men, but not boastful. They talk less of their exploits than the public likes. The brasshats apparently have decided to keep it that way. Certain critics, particularly Walter Lippman, believe the strategists in Washington have a long way to go before they will be as smart on undersea warfare as the Germans; this despite the fact that the sub is an American invention.

Maybe we aren't really smart in the way we run this branch of naval warfare, but there can be little criticism of how American subs fight. Prowling the dangerous waters of the western Pacific even to the coasts of Japan they are taking terrific toll of a wily and vicious enemy. One will get you five that when the victory score is at last compiled, the pig boats will be crowding the top.

From the April issue of "Click"

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A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

SUBSURFACE WELL TEMPERATURES

IT has been observed in drilling below the surface of the earth that in most instances there is a progressive increase in temperature with depth. A measure of such increase in temperature is termed the **geothermal gradient.** On the average, the geothermal gradient is about 1° F. for each 60 ft. of depth. Although in certain localities, variations from this normal gradient have been observed, it has been found that in any given well the natural geothermal gradient does not change unless such change is caused by some disturbance connected with drilling or producing of the well.

There are numerous engineering problems connected with the drilling and producing of wells which require for their solution a reasonably accurate measure of temperature at certain depths within the well. In taking subsurface pressure readings, the temperature at the point of measurement must be known in order to accurately evaluate the pressure. In the study of bottom-hole samples, it is necessary to know the temperature in the reservoir in order to know the physical properties of the reservoir fluid. Physical properties which are often desired, and which are influenced by temperature, include (1) saturation pressure, (2) viscosity, (3) density, (4) surface tension. In treatment and testing of rotary drilling fluid, it is desirable to make many of the laboratory tests at the temperature existing in the well. Energy calculations on flowing wells require that one have a fairly accurate temperature traverse in the well bore from top to bottom.

There has been some evidence in certain regions that variations in the geothermal gradient are related to the geologic structure. That is, the temperature gradient is abnormally high or low adjacent to or immediately above certain geologic structural features. In general, though, such variations are so inconsistent that no general rule has been worked out by which temperature measurements can be reliably applied to get any information as to structure enough in advance of complete development to be of much practical value.

In recent years, certain methods have been devised by which abnormal temperature gradients in wells can be applied to the solution of several problems often connected with the drilling and producing of gas and oil wells.

Conditions which may cause temporarily abnormal temperature gradients (temperature anomalies) in wells include:

1. Circulation of fluid through the bore hole while drilling.
2. Variations in the thermal conductivity of formations.
3. Expansion of gas as the gas enters the well bore from the formation.
4. Movement of fluids (oil, water, or gas) behind casing in a well or through a hole in the casing.
5. Presence of freshly set cement behind the casing.

The effect of any one of these conditions can often be recognized from a study of a temperature traverse taken in a well and a basis established from which certain conditions existing below the surface can be recognized.

Instruments are now available by which temperature measurements may be taken in wells. The design and use of these instruments will be discussed later in this series. The remainder of this present discussion will be devoted to explaining the principles involved in the interpretation of temperature measurements after they are obtained.

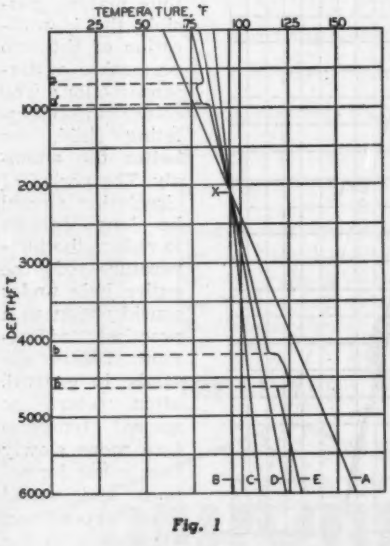

Fig. 1

In attempting to make any interpretation from a temperature survey in a well all other available data on the well should be carefully studied. Electric logs, drilling-time records, core analysis, casing records, productive history, completion practices, and many other items of information often have considerable bearing on the interpretation placed upon an observed temperature traverse. It is also important that the temperature upon which an interpretation is based be accurate within close limits. The recording should show temperature variations in the order of 0.2° F., although any actual temperature may be in error as much as 1° F.

Temperature Gradient

A convenient graphical record of a temperature gradient is obtained by plotting temperature as abscissae versus well depth as ordinate. Curve A of Fig. 1 represents the plotting of the normal temperature gradient for a 6,000-ft. well with a surface temperature of 60° F. Curve A represents the undisturbed natural gradient for this hypothetical well and other curves presented will demonstrate qualitatively how this natural gradient may be changed by certain disturbing influences. It should be realized that all of the curves presented in Fig. 1 are idealized, and that actual temperature gradients will exhibit certain irregularities.

During a period of rapid circulation in a rotary drilling well, it is possible that the circulating fluid throughout the depth of the well could approach a constant value as represented by Curve B of Fig. 1, although actually it would be expected to be somewhat cooler near the surface and a gradient taken immediately following circulation could be more nearly represented by Curve C of Fig. 1. At least, above some point X in the well the fluid immediately following circulation would be somewhat warmer than normal for that section of the hole while below the point X the fluid in the hole would be somewhat cooler than normal for that section of hole. Then immediately after circulation stops, the fluid above the

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

point X will lose heat to the adjacent formations which are at a temperature represented by Curve A for any given depth. At the same time the fluid in the hole below point X will be absorbing heat from the adjacent formations which are at higher temperature than the fluid. If the formations throughout the well were uniform in so far as their thermal conductivity were concerned, this cooling of the fluid above point X and warming of the fluid below point X could be represented as an intermediate step by Curve D of Fig. 1. But actually such uniform earth strata would rarely if ever be found, and variations would occur in the heat transfer rate from or to the well fluid due to variations in the thermal conductivity of different strata. For example, a water sand, having high thermal conductivity would cool or warm the well fluid more rapidly than a shale which has a relatively low thermal conductivity.

So let us suppose that on this well there is a water sand aa' of relatively high porosity and permeability above point X and another similar water sand bb' at some point below the point X, and the idealized temperature gradient obtained is represented by Curve E of Fig. 1. The presence of either of these sands could be detected by the irregularities in the temperature gradient following circulation; the upper irregularity being due to the relatively high cooling rate adjacent to the upper porous water sand and the lower irregularity being due to the greater rise in temperature adjacent to the lower water sand as the fluid in the well bore gradually achieves the natural temperature of the adjacent formations as represented by Curve A.

It should be pointed out that variations in the thermal conductivity of formations are chiefly due to the degree to which the formations will allow the circulation of convection currents. Thus the heat transfer rate adjacent to a formation will depend somewhat on its permeability to fluid passage.

The pivotal point X obviously does not occur at the same point in different wells. It should also be noted that the presence of even a highly porous and permeable stratum close to the pivotal point X could hardly be recognized because of the small difference between the natural temperature gradient and the temperature gradient immediately following circulation. It is well to realize, too, that for each well there is some definite time following circulation at which the greatest variation in temperature from one formation to another may be observed. In most cases, readings taken from 2 to 6 hours after circulation will give satisfactory results.

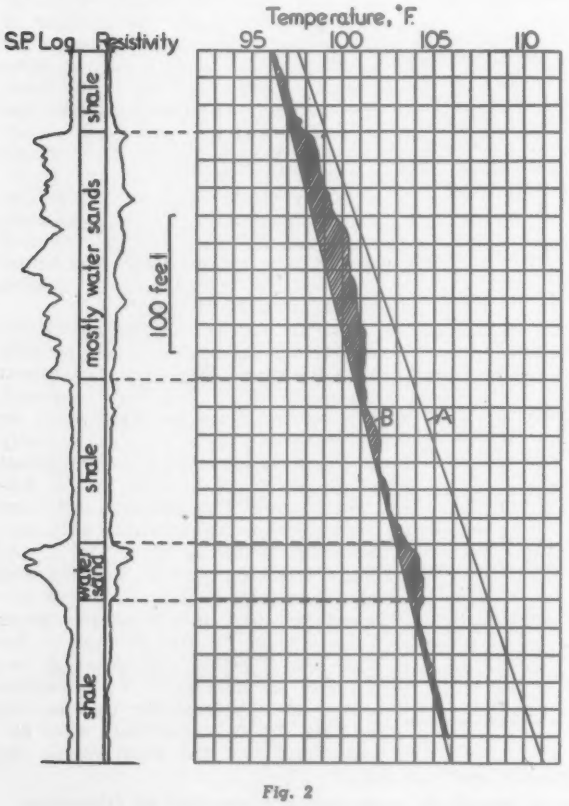

Fig. 2

It should be remembered that the circulation of cold fluid preceding a test of the nature just described is the condition that produces the temperature anomaly, thus making possible the identification of the two permeable water-sand sections. The colder the circulating fluid, the better the anomaly. The period of circulation should be long enough to reduce the temperature of the entire hole under consideration to a practical minimum. Oil or gas sands, in general, often return to normal temperature more slowly than other formations and would thus appear on the survey in the opposite direction to that indicated by Curve E of Fig. 1 as applying to certain water sands. It seems doubtful that any arbitrary rule can be solidly established by which one could positively distinguish between a water sand and an oil sand if judgment is based solely on a temperature survey. Under certain conditions, either a good oil zone or a very permeable and porous water sand may not be evident from a temperature survey because of improper technique or because of the influence of other natural or artificial factors that may not be recognized or properly evaluated. In any case all information available on a well should be carefully studied and considered in interpreting the temperature survey.

The temperature data, when used along with other information from core analysis, electrical logging, etc., should furnish valuable corroborative evidence for use in correlation of strata penetrated by the drill. The results of an actual temperature survey are shown in Fig. 2.* It can be seen that water sands indicated by the electrical log are corroborated by the temperature log. This actual plotting can be compared to the lower part of the theoretical plotting presented in Fig. 1. The temperature Curve A represents the probable normal gradient for this well, equivalent to Curve A of Fig. 1. The temperature Curve B was obtained a few hours after a period of mud circulation in the well. The "base line," drawn to the left of Curve B indicating the general trend of the temperature, aids in recognition of the anomalies. It is evident that the actual temperature anomalies caused by the water sands do not stand out as clearly as the theoretical ones caused by Curve E of Fig. 1, and do not show the upper and lower limits of such sands as accurately as does the electrical log. Thus, it should be realized that a temperature survey is not a sure-fire correlation method in itself but is valuable as supplementary information.

There are definitely many possibilities for advances in the application of subsurface temperature measurements to the study of well-producing problems. This is particularly true in regard to the proper technique of preparing the well for taking a temperature gradient and for interpreting the temperature gradient after it is secured.

References

Schlumberger, Doll, and Perebinossoff, "Temperature Measurements in Oil Wells," Journal of the Institution of Petroleum Technologists, Vol. 23, pp. 1-25, 1937.

Millikan, C. V., "Temperature Surveys in Oil Wells," Petroleuf Development and Technology, 1941, pp. 15-23.

*Reproduced from "Temperature Measurements in Oil Wells," by Schlumberger, Doll, and Perebinossoff, a paper presented before the Institution of Petroleum Technologists in London, England, Nov. 10, 1936.

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Natural Gas

Hope Natural Gas Co. Seeks Permit for 22-in. Line From Hugoton Field to Kanawha, West Virginia

WASHINGTON, D. C. — Plans to spend $51,000,000 for a 1,140-mile, 22-in. natural-gas line from the Hugoton field in southwestern Kansas to connect with existing facilities in Kanawha County, West Virginia, were disclosed here last week in an application filed by Hope Natural Gas Co., with the Federal Power Commission.

The application for a FPC certificate of convenience and necessity shows that the total estimated cost of the project is $50,904,711 which the petitioner proposes to handle by issuance of approximately $40,000,000 of bonds or other instruments of indebtedness with the remainder from current assets.

Supplementary Supply Vital

"It is necessary," states the application, "that the proposed facilities be constructed and put into operation by the summer of 1944, to avoid large curtailments to important war industries in the Appalachian area."

The proposed facilities, including nine compressor stations aggregating 68,000 hp. would deliver 180,000,000 cu. ft. of gas per day at the eastern connection, according to the application. At 100 per cent load factor, the new line would bring into the Appalachian area 65,700,000,000 cu. ft. of gas per year, and at 90 per cent load factor, 59,130,000,000 cu. ft. Through the installation of additional compressor stations, the application points out, the proposed facilities will be capable of delivering at the eastern end 240,000,000 cu. ft. per day.

"The proposed facilities are required by the present and future public convenience and necessity, peacetime and war alike," the application states, and emphasizes that "while the critical supply situation results from the war, the proposed facilities will be fully required in the postwar period to meet the normal market requirements of applicant and its affiliates. Even though these demands may fall below present levels, applicant anticipates, in the light of its experience following the former war-production period of 1916 to 1918, that new supplies of gas must be brought into the Appalachian area to augment West Virginia gas and to aid in meeting normal market requirements. Applicant, therefore, intends that the proposed facilities shall not be regarded merely as a wartime measure but shall constitute a long-term project for bringing supplies of gas into the Appalachian area."

In a letter filed with the application, the Hope company says in part:

"To prevent curtailment to war industries, we believe that the line should be completed by August 1944 so that large quantities of gas may be put into storage for use in meeting the peak loads of the following winter. This leaves approximately 13 months, and at the very least 10 months will be required for construction.

"In 1941, prior to the amendment to Section 7 of the Natural Gas Act, this company purchased a right-of-way for a proposed pipe line to the Monroe field in Louisiana, and 225 miles of that right-of-way, from Cornwell station to Danville, Ky., will be available for the proposed line. Two station sites upon this portion of the right-of-way also were acquired in 1941. Construction of this portion of the line and these two compressor stations could be commenced immediately upon receipt of materials, so that work could be carried on pending the survey and acquisition of rights-of-way for the remainder of the proposed line.

Gas Contracts Solicited

"We are presently engaged in negotiating contracts for the purchase of gas from producers operating in the Hugton gas field, and we are formulating plans for the letting of construction contracts all contingent upon obtaining necessary governmental authority for the line.

"The Hope company will therefore be in a position to commence construction immediately upon receipt of the necessary authority from the Office of War Utilities and from this commission.

"An application to the Office of War Utilities for necessary priorities and allocation of materials and for authority to commence construction is being concurrently filed, and we will prosecute such application with due diligence."

The Hope Natural Gas Co. is engaged in selling gas at retail to domestic, commercial and industrial consumers in West Virginia and is selling gas at wholesale to the following affiliated companies: The East Ohio Gas Co., Peoples Natural Gas Co., and the River Gas Co. Hope also sells gas at wholesale to the following nonaffiliated companies: Manufacturers Light & Heat Co., Pittsburgh, Pa.; Fayette County Gas Co., Pittsburgh, Pa., and the Mount Morris Gas Co., Waynesburg, Pa.

United Gas Asks Permit On New Louisiana Line

WASHINGTON, D. C.—United Gas Pipe Line Co., Shreveport, La., presented its application here July 8 before the Federal Power Commission, asking authority to construct and operate a 12¾-in. 18-mile gas line in Louisiana and for permission to make certain other changes in its system. The company seeks authority to remove and sell certain facilities in Texas and to acquire from Willmut Gas & Oil Co., approximately 84 miles of 8⅝-in. line in Mississippi.

Low-Pressure Gas in East Texas May Be Run

DALLAS, Tex. — Arrangements to take low-pressure gas from the Cayuga and Long Lake fields in Anderson County, East Texas, were under consideration here this week by Lone Star Gas Co., it was announced by D. A. Hulcy, president of the company.

Operators in the two fields were warned several weeks ago by the Railroad Commission either to make arrangements for commercial utilization of low-pressure gas produced inadvertently with crude oil and condensate or to install facilities for returning the residue gas to the producing formation.

Panhandle Rate Reduced On Gas Sold to Ohio Fuel

COLUMBUS, Ohio.—The Federal Power Commission last week announced issuance of an order allowing reduced rates for natural gas sold by Panhandle Eastern Pipe Line Co. of Kansas City, Mo., to the Ohio Fuel Gas Co., Columbus, Ohio, for resale.

The revised schedule reduces rates for gas to be delivered for resale through interconnections between the companies' pipe lines from 2.5 cents to 1.6 cents per therm for gas delivered prior to May 1, 1943, and to 1.9 cents per therm for gas delivered after that date.

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REFINING

Standard of California To Build $13,500,000 Plant

WASHINGTON, D. C. — Contract for construction and operation of petroleum-refining facilities costing $13,500,000 by Standard Oil Co. of California was executed here last week by the Defense Plant Corp. Details were not disclosed in the announcement by Secretary of Commerce Jones.

Standard of California will operate the plant, title remaining in DPC, a subsidiary of the Reconstruction Finance Corp.

Gulf Starts Production From New Toluene Plant

PHILADELPHIA, Pa. — The Gulf Oil Corp. began the manufacture of nitration-grade toluene at its refinery here July 2 in a modern unit built at the request of the Army Ordnance Department and constructed entirely by the company. The raw material for the new toluene plant is gasoline obtained from existing facilities.

Built under high priority ratings, the new Gulf unit is the second to be constructed along the eastern seaboard. Most other petroleum toluene plants are located in the west and south.

The new Gulf plant was erected by the Foster Wheeler Corp. and the output is a military secret.

Globe Patent Decree Is Affirmed by Circuit Court

CHICAGO. — A decree finding for the Globe Oil & Refining Co., in a patent-infringement suit brought by Universal Oil Products Co., was affirmed here last week by the U. S. Seventh Circuit Court of Appeals.

The decision affirmed was rendered by Judge William H. Holly who held that the Dubbs patent of October 3, 1921, basis of the suit, was valid but not infringed. The Holly decision had held that the Egloff patent of May 12, 1925, also involved, was invalid. The appeals court majority took no stand on the latter question.

The trial court decision as to infringement was reached as the result of resolving a bitter fight over the meaning of the term "vaporization prevented" in the patent claim.

The appeals court opinion quoted extensively from dictionaries in defining the word "vaporization." It also quoted from the Dubbs patent to the effect that the process heated oil to the cracking temperature, adding, "but substantial vaporization prevented." This was accomplished, although the claim did not say so, by use of different sized tubes and application of heat and its withdrawal when the cracking point is reached, the court found.

In contrast, the appeals court opinion said, the apparatus and process of Globe, the defendant, not only heat to the cracking point, but heat to a point where cracking and vaporization take place, with no effort made to prevent vaporization.

Joining in the opinion were Judges Evans and Major, circuit judges. Judge Lindley, district judge sitting in the court, agreed that the judgment should be affirmed. However, he felt affirmance should be on the ground that the Dubbs patent was invalid because prior art patents showed anticipation. He was also of the opinion that if the Dubbs patent is valid, it is infringed by the Globe process. He was of the opinion the Egloff patent is invalid.

The majority opinion passed over the defendant's contention that the Dubbs patent is invalid.

Refiners Urged to Order Alloy Still Tubes Now

CHICAGO.—Two steel mills, according to advices disseminated last week by the Petroleum Administration for War, will have potential idle capacity for the production of carbon molybdenum and alloy still tubes during the last 4 months of this year.

The District 2 PAW Materials Division, in view of the open still-tube capacity, advised refiners this week to air-mail orders for such of these critical materials as necessary for maintenance, repair and operating supplies, to the Washington office as early as possible.

Specifications should be confined to standard analyses of carbon-molybdenum alloys, such as 2 per cent chrome molybdenum and 5 per cent chrome molybdenum. Plain ends should be specified. If internal-upset still tubes are desired, the refiner should specify minimum wall thick-

ness rather than average wall thickness.

Frank A. Watts, director of materials for PAW, Washington, advised the District 2 office here that instructions to refiners are being prepared for first quarter, 1944, MRO controlled materials.

Escalator Clause Eases Fear of Army Contracts

WASHINGTON, D. C.—Inclusion of a new escalator clause in Quartermaster Corps contracts for petroleum products is expected to expedite and clarify procurement of fuel oil and gasoline for the Army.

The escalator clause provides a flexibility for contracts by permitting price increases to conform with changes in OPA ceiling prices for crude oil or for other reasons that might materially affect prices charged by oil refiners. Similarly it permits decreases in prices when such costs are reduced. All changes are subject to renegotiation.

Heretofore, oil refiners have been reluctant to sign Army contracts because of possible fluctuations in the price of crude oil. Refiners operate on such a narrow margin that even a small increase in the price of crude oil often wipes out the entire profit on a contract and sometimes even produces a net loss.

This difficulty is now being overcome by the escalator clause which permits the increase of prices for petroleum products sufficient to absorb any justifiable increase in the cost of the product. The net result will be to maintain substantially the same margin of profit at all times and simultaneously to protect the Government by producing lower prices in the event of an OPA reduction in the ceiling of crude oil or products.

Because of the unsettled condition of the crude-oil market, most Army petroleum procurements have previously been handled under spot-purchase contracts varying from day to day. The new system will permit definite, long-term contracts with a resulting assurance of uninterrupted deliveries and fairer prices for both the producer and the Government.

Abercrombie-Harrison Commitment Increased

WASHINGTON, D. C. — Additional facilities costing approximately $1,100,000 have been authorized by the Defense Plant Corp., for installation at the J. S. Abercrombie Co., and Harrison Oil Co., aviation-gasoline plant at Houston, Tex.

The higher commitment authorized last week by DPC increases the overall cost of facilities at the Abercrombie and Harrison plant to $15,500,000.

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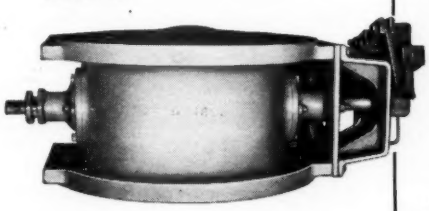

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PIPE LINES

Construction to Start On New Products Line

CHICAGO.—Construction is scheduled to start within the next 2 weeks on the Sinclair Refining Co., pipe line department, 200-mile product line from East Chicago, Ind., to Toledo, Ohio, a government-approved project which will have delivery capacity of 30,000 bbl. daily. The line is to be completed this fall, probably around October 1.

Pipe has been allocated for the line which will extend from Sinclair Refining Co.'s 55,000-bbl. plant at East Chicago, to the western extremity of Lake Erie. In conjunction with the line's operation, it is planned that a fleet of Erie barge canal tankers will operate in moving products on eastward. Sinclair has acquired a dock site and marine terminal at Toledo which will cost a total of $1,000,000 for the property and improvements.

Humble Completes Deal For Atlas' 6-In. Crude Line

MARSHALL, Tex. — The 44.104-mile, 6-in. crude-oil line of Atlas Oil & Refining Co. has been purchased by Humble Oil & Refining Co., possibly for delivery of North Louisiana sweet oil to the Longview, Tex., terminal of the WEP 24-in. emergency carrier.

Humble's newly acquired line extends from Shreveport, La., where it formerly delivered East Texas oil to the Atlas refinery, to a point in Gregg County, Texas, in the north end of the East Texas field.

The consideration was $221,223.65, according to an instrument filed here with the Harrison County clerk.

Three Contractors Share Panhandle Eastern Job

BARTLESVILLE, Okla.—Contract for extending and looping portions of the Panhandle Eastern Pipe Line Co.'s natural-gas transmission system from Amarillo, Tex., to Kansas City, Mo., were awarded last week to a group composed of the W. A. Bechtel Co., San Francisco, Calif.; O. E. Dempsey Construction Co., Tulsa, and H. C. Price Co., Bartlesville.

The contract calls for 120 miles of 26-in. loops and the relaying of 35 miles of 22-in. line paralleling the main transmission system from Moore County, Texas, to Kansas City where delivery capacity will be increased to 90,000,000 cu. ft. daily.

Construction work was to have started this week and completion is scheduled early in the fall before the consumption of gas, already heavy because of war plants in the Middle West, makes its seasonal move into higher brackets.

Contractor Sues Over Higher Construction Costs

PEORIA, Ill.—Suit to collect $175,000 from the Illinois Natural Gas Co., Springfield, Ill., was filed here last week in Circuit Court by the Oil States Construction Co., Tulsa.

Plaintiff alleged defendant company refused to keep an agreement for payment of funds for construction of a pipe line through Peoria and Knox counties. The agreement, the plea alleges, was drawn late in 1941, when bad weather materially increased the construction company's cost of laying the line.

Temporary Injunction Halts Michigan Line

MOUNT PLEASANT, Mich.—A temporary injunction, restraining Standard Oil Co. of Ohio from building a pipe line to the Rose Lake field in Osceola County, Michigan, was issued last week in Isabella Circuit Court.

Plaintiffs in the proceedings were Roosevelt Oil Co., Mount Pleasant, and Simrall Corp., a crude-oil purchaser and pipe-line operator in Michigan.

The Roosevelt company charged that Standard of Ohio is bound by contract not to enter Central Michigan fields as a pipe-line purchaser and gatherer of crude oil in competition with Simrall. C. L. Maguire, president of both the Roosevelt and Simrall companies, said his concerns had been in disagreement with Standard of Ohio since March when the latter company, according to his testimony, sought to increase its purchases of crude from the Simrall system.

The Roosevelt company, which operates a 6,000-bbl. refinery at Mount Pleasant, charged the Standard of Ohio's pipe-line proposal is an attempt to circumvent agreements made

in 1936 for division of crude bought by Simrall. The Simrall company was organized in 1932 and in 1936 Standard of Ohio purchased 50 per cent interest in the company. Since that time, Sohio Corp., affiliate of Standard of Ohio, has operated as a pipeline transporter, chiefly to Toledo, and for the past year the company's producing division has increased the scope of Michigan operations.

Northern Natural Asks To Build New 24-In. Loop

WASHINGTON, D. C.—The Federal Power Commission last week set hearing here for July 15 on applications filed by the Northern Natural Gas Co., Omaha, Neb., for (1) permanent authorization under Section 7 of the Natural Gas Act, as amended, to install, construct and operate facilities now temporarily authorized in Kansas and Nebraska, and (2) authority to install, construct and operate certain additional facilities in Kansas and Texas.

According to the order, which consolidates the proceedings for the purpose of hearing, the applications involve additions to the applicant's facilities said to be required in order to enable the Northern Natural to maintain its present capacity.

The commission temporarily authorized the installation, construction and operation of a 1,000-hp. compressor unit, a 1,300-hp. unit and an 800-hp. unit at the company's existing stations in Kansas and Nebraska, and a loop line of 20 and 24-in. about 6.2 miles long in Kansas.

By its application of April 15 the company seeks authority to install, construct and operate an additional 1,000-hp. compressor unit at an existing station in Texas, and a 24-in. loop line, approximately 25.1 miles long, in Kansas.

EXECUTIVES INSPECT BAYOU PIPE LINE SYSTEM

Front row: E. V. Hewitt, manager Pan American Pipe Line Co.; O. Q. Lomax, vice president and general superintendent Humble Pipe Line Co.; H. H. Anderson, vice president Shell Pipe Line Corp. and manager of Bayou Pipe Line System; F. C. Richards, chief engineer Fannett station; L. F. Riegel, general sales manager Gulf States Utilities Co.; A. E. Jago, executive assistant to the vice president Shell Oil Co., Inc.; M. M. Stuckey, general manager Iraq Petroleum Co., Ltd.; Back row: C. V. Merriam, Beaumont division manager Gulf States Utilities Co.; S. S. Sellors, public-relations representative Shell Oil Co., Inc.; H. S. Lane, vice president Crown Central Petroleum Corp.; E. A. Birge, chief dispatcher Plantation Pipe Line Co.; O. D. Crites, manager crude-oil department Shell Oil Co., Inc., Texas Gulf area; R. H. Maupin, traffic manager southern district Pan American Petroleum & Transport Co.; F. C. Clark, traffic manager Crown Central Petroleum Corp.; L. J. Rittiner, engineer Shell Pipe Line Corp. (Bayou System); C. R. Younts, president Plantation Pipe Line Co.; H. C. Leonard, vice president Gulf States Utilities Co.; T. E. Swigart, president Shell Pipe Line Corp.; R. B. High, Washington, D. C., representative Shell Oil Co., Inc.; E. L. Robinson, manager industrial sales Gulf States Utilities Co.; E. C. Adams, system electric engineer Gulf States Utilities Co.

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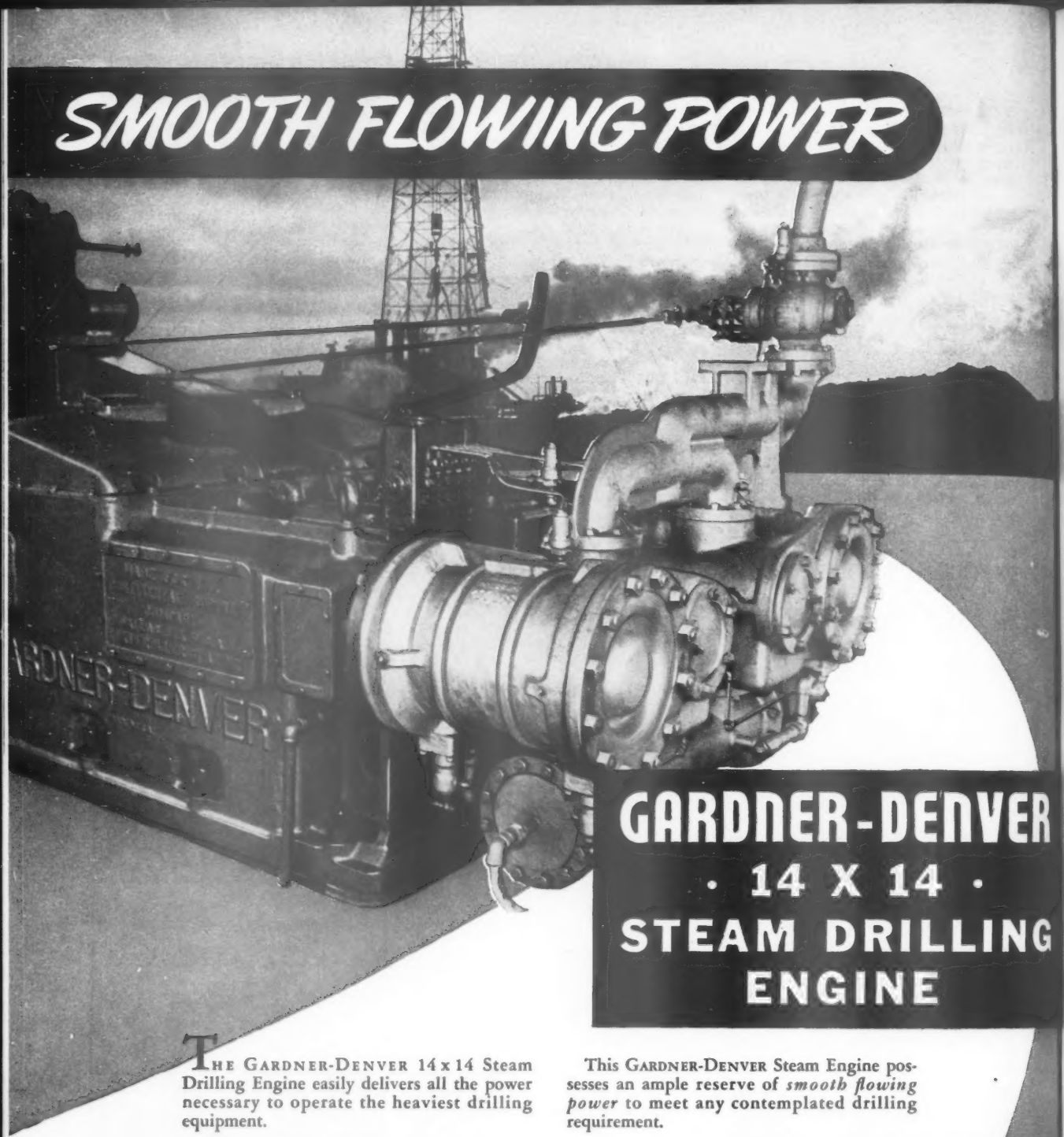

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CONTINENTAL

OILFIELD TOOLS AND GAS ENGINES

Exploration and Drilling

Week's Highlights

THE question "How deep can porosity exist?" (p. 66) is indicative of a number of problems whose solution up to the present time has been based largely on thought and calculation rather than on observation. A similar one is "How deep can oil exist?"

Everyone knows that temperatures increase with depth so that if oil is buried to greath depth, it will undergo some distillation. Some men have forgotten this point and have assumed that since the depth of the lowest potential reservoirs in some basins is around 50,000 ft., it is possible that oil will be found to that depth. From this it follows that all the oil industry is waiting for to uncover tremendous quantities of oil are metallurgical advances and the development of a mud which would permit drilling to such depths.

Others, including the present writer, have remembered enough physical chemistry to predict that these fields, if found, would probably be distillate fields only to be confounded by the fact that oil is being found around the margins of an increasing number of distillate fields. If our "thinking" had gone far enough, this condition should have been foreseen.

If "thinking" about oil deposits resulted only in the formulation of theories, little damage would be done. However, in the case of the conception that oil would be found as deep as we could drill, the result was a feeling of optimism regarding the nation's reserves which had the further result of lessening insistence on proper conservation of the reserves that had been found. Considering that only distillate would be found at depth led directly to the development of these deep fields as distillate fields rather than as oil fields with an abnormally large wet-gas cap. This also is leading to waste.

Another field of endeavor in which "thinking" has greatly influenced development procedures is the matter of well spacing. It may be that wide-spacing patterns will drain a field more economically than close-spacing patterns provided the proper rate of production is maintained. It is definitely known, however, that this rate has not obtained in the past in more than a handful of fields. Laboratory experiments may prove misleading on this subject as they must be set up with some factors eliminated which actually exist in reservoirs. Publication of views regarding spacing may lead to the idea that wide spacing plus production control will adequately drain a reservoir only to find that it will not because pressure was not maintained by recycling. On the other hand, in some fields, recycling may lead to channeling.

The trouble with "thinking" is that it is so often subjective. When a man thinks that the nation's reserves are far from being exploited and that there is an enormous quantity of oil waiting to be discovered, he can usually find enough evidence to confirm his belief. On the other hand, the pessimist who sees the beginning of the end in the declining discovery rate also can produce much evidence to "prove" that he is right. "Thinking" is, however, so much easier than assembling and collating facts that most of the enormous body of factual knowledge possessed by the oil industry lies crumbling in the files while we "think" our way out of our present difficulties, or, quite possibly, deeper into them.

As the factual knowledge in the possession of oil operators is not available to them in complete and usable form, it follows that governmental agencies are compelled to depend almost entirely on "thinking." At this point, the reader must be left to complete the argument.

COMPLETIONS IN ALL FIELDS . . .

(Week ended July 3, 1943)

	Oil	Gas	Dry	Total	Footage	Total comp. to date 1943	1942
N. Y., Penn., W. Va.	49	9	2	60	111,045	1,630	1,763
Ohio	1	4	8	13	31,296	401	505
Indiana	1	0	2	3	3,322	119	167
Kentucky	4	2	4	10	21,980	177	112
Illinois	19	1	17	37	95,459	833	790
Michigan	5	3	9	17	40,524	248	341
Kansas	20	0	21	41	144,155	768	735
Nebraska	0	0	0	0	0	14	21
Missouri-Iowa	0	0	0	0	0	7	9
Oklahoma	14	1	8	23	77,897	550	647
Texas:							
North Central Texas	6	0	15	21	58,872	611	604
West Texas	14	0	5	19	87,083	412	823
Texas Panhandle	1	0	0	1	3,250	88	209
Eastern Texas	5	0	1	6	32,546	136	197
Texas Gulf Coast	3	1	4	8	49,067	209	406
Southwest Texas	11	1	7	19	106,880	434	641
Total Texas	40	2	32	74	337,707	1,890	2,880
North Louisiana	2	2	3	7	37,154	152	238
Louisiana Gulf Coast	0	0	1	1	10,220	173	269
Total Louisiana	2	2	4	8	47,374	325	507
Arkansas	4	1	1	6	30,471	120	74
Mississippi and Southeast	0	0	2	2	3,697	46	30
Montana	3	3	2	8	16,539	95	81
Wyoming	2	0	0	2	9,448	54	47
Colorado, Utah	0	0	0	0	0	6	8
New Mexico	2	0	1	3	11,147	106	122
California	24	0	3	27	79,833	625	394
Total United States	190	28	116	334	1,061,894	8,014	9,233
Total previous week	189	38	111	338			
Week ended July 4, 1942	168	55	102	324			

Porosity Limit With Depth

*by H. W. Bell**

THE reserves of petroleum yet to be added to world supplies may be linked with a factor which has apparently been disregarded. It is easy to realize that at some depth sufficient plasticity will obtain, due to pressure and heat, to eliminate porosity and hence eliminate fluid production therefrom. But will that critical depth ever be attained through the ingenuity of man?

Assume the average specific gravity of the upper crust to be 2.6. Where there is porosity there will be fluid of some sort—water if nothing else. Water, or another compressed fluid in the pore spaces will mitigate against compressional collapse. Except in lenticular conditions the water effect should be about 1.0, its approximate specific gravity. The remaining effective gravity for collapse then is 1.6. Then 1.6 × 0.434 gives 0.692, which is the effective collapsing force in pounds per square inch per foot of depth. It is not so easy to arrive at minimum, average or maximum compressive strengths of materials that constitute our reservoirs. If we use a strength of 10,000 lb. per sq. in. at atmospheric temperature, the material should lose porosity at 14,500 ft.

At least some material is stronger than this because there seems to be some porosity at 15,000 ft. Gutenberg† gives compressive strengths of sandstones and quartz at 60° F. as from 1×10^9 to 4×10^9 dynes per sq. cm. Two samples of limestone are rated at about the latter figure. In this connection this observation is made, "From the foregoing data we may safely conclude that near the surface of the earth the strength is of the order of magnitude of 10^9 dynes per sq. cm." This figure is equivalent to about 14,500 lb. per sq. in. or to 21,000 ft. at 60° F. At 400° F. or more the average depth of failure may be less. From the above, 21,000 ft. or considerably less might be considered as a minimum depth of collapse of porosity.

It seems possible that some of the reservoirs may have lost their porosity when a depth of about 14,000 ft. of overburden was attained, but others may remain open with reasonable porosity at 80,000 ft. It appears possible that failure of a reservoir could take place at a pressure between the elastic limit and ultimate compressive strength because of the influence of a geologic time. It is interesting to contemplate what would happen to a deposit of oil that is gradually covered to greater depths until the porosity collapses. The oil would probably previously go into the gaseous phase and reach a higher density than its liquid. The surmise is made that it would enter the available pores of the surrounding shales and probably finally enter into chemical combination with the formations.

It would be interesting to have the data on the porosity of continuous sedimentation where sections exceed 20,000 ft. A petrographic study of the former sandy portions of such series should be made before conclusions are drawn.

The writer hopes to stimulate discussion on this subject by these few observations.

*Director of Minerals, Baton Rouge, La.

†"Physics of the Earth"—VII Internal Constitution of the Earth, Beno Gutenberg.

DISCUSSION

by W. V. Howard

Mr. Bell's question regarding the depth at which porosity can exist is one which should have been answered, at least theoretically, many years ago. If an oil reservoir, together with the enclosed fluids, is considered as being completely surrounded by other rocks so that there are no avenues of escape for the fluid under pressure, then the depth at which collapse could take place would be very great.

For example, a rubber container filled with water could be compressed by a piston in a cylinder almost indefinitely without rupture unless there was a molecular change in the rubber itself. The water would exert an outward pressure equal to that exerted by the piston and the degree to which it would be compressed would not be sufficient to overcome tensile or compressive strength of the container. Similarly, the elasticity of sand grains would be sufficient to permit the rock to exert pressure on the contained fluids so that there would be a reduction in the differential pressure forming the collapsing force and a corresponding increase in the depth of collapse.

Another modifying factor is the fact that there is a continuous solution of silica in the water accompanied by reprecipitation around the grains. In this process, it is known that the smaller grains, having the larger surface relative to their mass tend to dissolve while precipitation takes place around the larger grains. Because of the variable rigidity of the rock, solution would be greater at the points of most strain which would further complicate the process by decreasing the depth of collapse.

Theoretical mathematical computations would be most complicated if all factors are considered and omission of any one of them might lead to a conclusion similar to that reached by George Darwin when he showed mathematically, on certain assumptions, that the moon flew out of the Pacific Ocean 20,000,000 years ago.

Experimental results may throw light on the problem, provided the manner in which the experiments were performed is taken into consid-

DAILY AVERAGE PRODUCTION FOR WEEK

	July 3 crude oil	July PAW quota all oils	June 26 crude oil
Arkansas	75,700	77,200	75,150
California	770,500	827,000	763,250
Colorado	6,285	7,000	6,040
Eastern fields	96,750	113,100	99,300
Illinois	208,000	233,000	216,500
Indiana	14,500	14,500	15,250
Kansas	280,100	300,000	306,950
Louisiana	335,900	331,300	325,550
North Louisiana	*85,100*	.....	*84,700*
Louisiana Gulf Coast	*250,800*	.....	*240,850*
Michigan	56,100	60,100	
Mississippi	55,000	50,000	53,100
Montana	23,120	21,800	21,700
Nebraska	2,200	2,200	2,000
New Mexico	98,750	105,700	101,100
Oklahoma	335,500	361,400	339,400
Texas	1,548,400	1,727,000	1,497,700
East Texas	*350,400*	.....	*334,900*
West Texas	*236,100*	.....	*228,950*
North Central Texas	*134,300*	.....	*131,800*
East Central Texas	*125,500*	.....	*123,500*
Texas Panhandle	*90,200*	.....	*90,100*
Texas Gulf Coast	*534,100*	.....	*514,550*
Southwest Texas	*77,800*	.....	*73,900*
Wyoming	89,640	97,200	97,695
Total United States	3,996,445	4,328,500	3,975,085
Total production Jan. 1-July 3, 1943			721,270,115 bbl.
Same period last year			696,391,245 bbl.

eration. The behavior of a core of rock in a cylinder will be very different from that of a large section of the same rock buried in the earth. Values for the resistance of sandstone to collapse range from 3,400 ft. to 42,000 ft., but these values are probably for unsaturated rock.

Fortunately, rocks contain the evidence of practically everything that has happened to them since their deposition and Mr. Bell's suggested plan of attack will lead to a truer conception of affairs than any mathematical computations. Cores have been taken from thousands of sands. The greatest depth of burial of these sands can be computed. Thin sections will not show the amount of quartz that has been dissolved but will show the amount that has been reprecipitated and where it was deposited. Incipient rupture of quartz grains is plainly shown by strain shadows. If this evidence of strain is confined to the grains and does not extend into the reprecipitated silica, it has no bearing on the problem as the strain shadows might have been formed in the rock from which the sand grains have been derived. If these strain shadows extend beyond the edges of the original grains and into the silica deposited later, then the reservoir itself had begun to show signs of collapse.

Cores are, naturally, not available from below the present limits of drilling but there are exposed great thicknesses of sediments which have not been subjected to lateral thrusts. One such section is in the Keweenaw Peninsula of Michigan. Others are in the faulted Cordilleran areas. A suite of thin sections prepared from these districts would provide much information on the very important point that Mr. Bell has raised.

CALIFORNIA

Dry-Gas Area Opened Up in Sacramento County

LOS ANGELES, Calif. — Amerada Petroleum Corp. 1 Capital appears to have discovered a new gas field in the Thornton district of Sacramento County in the so-called Delta region. This wildcat prospect is in 36-5n-5e. On a formation test at 3,360-90 ft. the well flowed dry gas at a daily rate of 6,500,000 cu. ft. After testing, Amerada landed pipe at 3,390 ft. and is perforating for a production test.

The Thornton district is about 15 miles northeast of the Rio Vista gas field and approximately 6 miles northwest of the Lodi gas field which Amerada discovered a short time ago. It is located in a general northwest-southeast trend with Lodi and is probably a separate productive district rather than an extension.

Amerada's discovery well was carried down to 8,367 ft. Top of the Cretaceous was logged at 5,800 ft.

Kern County. — The outpost completed last week by C. C. M. Oil Co. at the southwest end of the Midway field continues to hold up and pressures have become stabilized at 250 lb. on the tubing and 450 lb. on the casing. It is too early to determine full significance of this outpost because of the lenticular condition of the Midway-Sunset field and the multiplicity of productive zones. It is possible, however, that this well may prove to be an important extension that would open up considerable territory for development. Several additional wells are being started and within another 30 days the importance of this new well may become more obvious. In the Greeley field, Superior Oil Co. stepped out another location on the Lewis lease in 12-29s-25e and completed a flowing well in the Rio Bravo sand of the Miocene. In the Rio Bravo field, General Petroleum Corp. recompleted 1 Caldwell in 35-28s-25e flowing 310 bbl. of 36.9-gravity oil and 621,000 cu. ft. of gas daily from the Rio Bravo and Vedder pays.

Fresno County.—Northwest of Raisin City, Seaboard Oil Corp., in conjunction with Tide Water Associated Oil Co. and Union Oil Co., spudded 53-14 S.T.U., 14-15s-17e, and has resumed drilling after landing surface pipe.

SAN JOAQUIN VALLEY COMPLETIONS

Belridge, South, Kern County: General Pet. Corp. 36-2-A Belridge, 2-29s-21e, pumped 60 bbl., 16-gravity, 10 per cent cut, T.D. 3,296 ft., P.B. 1,090 ft., perf. 604-94 ft., 880-954 ft., 995-1,088 ft., completed in South Belridge zone.

Shell 2 T.W.A., 1-29s-21e, pumped 75 bbl., 15.1-gravity, 25 per cent cut, T.D. 1,119 ft., P.B. 1,030 ft., perf. 851-912 ft., 942-985 ft., 1,002-28 ft., completed in South Belridge zone.

Buena Vista Hills, Kern County: Standard 80-7-D, 7-32s-24e, pumped 40 bbl., 19.6-gravity, 20 per cent cut, T.D. 2,[illegible]0 ft. perf. 2,710-2,928 ft., completed in Buena Vista Hills zone.

Standard 101-11-D, 11-32s-24e, pumped 75 bbl., 19.9-gravity, 40 per cent cut, T.D. 2,942 ft., perf. 2,870-2,940 ft., completed in Buena Vista Hills zone.

Union 20 McLeod, 34-31s-23e, pumped 85 bbl. net, 19.9-gravity, 20 per cent cut, T.D. 3,697 ft., perf. 3,036-66 ft., 3,194-3,294 ft., 3,348-62 ft., 3,579-3,690 ft., completed in Buena Vista Hills zone.

Coalinga, East, Fresno County: Shell 168-15 fee, 15-19s-15e, pumped 64 bbl., 18.8-gravity, 10 per cent cut, T.D. 1,716 ft., perf. 1,531-1,654 ft., 1,693-1,715 ft., completed in East Coalinga zone.

Shell 146-29 fee, 29-19s-15e, pumped 101 bbl., 17.1-gravity, 1 per cent cut, T.D. 2,073 ft., perf. 1,984-2,018 ft., 2,038-69 ft. completed in East Coalinga zone.

Cymric, Kern County: Honolulu 32-26-A Fitzgerald, 26-29s-21e, pumped 9 bbl net, 12.6-gravity, 125 bbl. water, T.D. 3,953 ft., P.B. 1,205 ft., perf. 1,046-1,203 ft., Tulare, Pleistocene, oil sand 1,150-95 ft., Pliocene brown shale 3,920 ft.

Elk Hills, Kern County: U. S. Navy 74-2-G 2-31s-24e, pumped 28 bbl., 22.9-gravity, 3 per cent cut, T.D. 3,075 ft., perf. 2,875-2,965 ft., Tupman zone.

U. S. Navy 21-3-G, 3-31s-24e, pumped 130 bbl., 19.9-gravity, 0.2 per cent cut, T.D. 3,024 ft., P.B. 2,945 ft., perf. 2,904-44 ft., completed in Tupman zone.

U. S. Navy 36-27-S, 27-30s-24e, pumped 202 bbl., 19.8-gravity, 0.3 per cent cut, T.D. 3,358 ft., P.B. 3,330 ft., perf. 3,252-71 ft., 3,923-2,327 ft., completed in Tupman zone.

Greeley, Kern County: Superior 3 Lewis, 12-29s-25e, flowed 1,325 bbl., 37.5-gravity, 0.9 per cent cut, 1,000,000 cu. ft. gas, 32/64-in. bean, pressures 1,000/1,225 lb., T.D. 11,453 ft., perf. 11,399-11,428 ft., completed in Rio Bravo zone of Miocene age, bottomed in siltstone above Vedder.

Kern Front, Kern County: Pacific Western 6 Premier, 21-27s-27e, pumped 24 bbl., 11.3-gravity, 1 per cent cut, T.D. 3,257 ft., P.B. 2,170 ft., perf. 2,125-70 ft., M point 1,905 ft., Chanac 1,905 ft., McVan silt 3,120 ft., Olcese sand 3,214 ft., completed in Chanac.

Standard 23-5 fee, 5-28s-27e, pumped 15 bbl. net, 14.9-gravity, 90 per cent cut, T.D. 2,865 ft., 60 mesh perf. 2,625-2,860 ft., M point 2,490 ft., N point 2,598 ft., P point 2,622 ft.

Standard 27-5 fee, 5-28s-27e, pumped 105 bbl. net, 13.4-gravity, 30 per cent cut, T.D. 2,880 ft., 100 mesh perf. 2,649-2,878 ft.

Standard 63-15 fee, 15-28s-27e, pumped 38 bbl., 14.1-gravity, 30 per cent cut, T.D. 2,880 ft., perf. 1,990-2,270 ft.

Midway-Sunset, Kern County: C.C.M.O. Co. 69-4-G, 9-32s-23e, pumped 20 bbl., 19.1-gravity, 15 per cent cut, T.D. 3,121 ft., P.B. 2,750 ft., perf. 2,501-33 ft., 2,545-67 ft., 2,682-2,749 ft.

Doyle Pet. Corp. 1 Equitable, 10-32s-23e, pumped 70 bbl., 15.9-gravity, 20 per cent cut, T.D. 2,910 ft., P.B. 2,580 ft., perf. 2,335-2,580 ft.

Round Mountain, Kern County: Crestmont Oil Co. 9 Staley, 9-28s-29e, pumped 90 bbl., 17.2-gravity, 2 per cent cut, T.D. 1,805 ft., 100 mesh perf. 1,776-1,805 ft.

Round Mountain wildcat district, Kern County: R. M. Kiesau 1 Round Mountain, 24-18s-28e, dry in gray sand, T.D. 2,415 ft., Vedder zozne topped at 2,323 ft.

Palomar Refining Co. 1 Russell, 6-28s-29e. Walker formation dry. T.D. 1,771 ft Vedder zone.

LOS ANGELES BASIN

Present indications are that several wildcat wells will be started within the corporate limits of Los Angeles within the next 30 days. A new group of councilmen took office July 1 and much depends upon their attitude with respect to drilling near residential areas.

The attempts to undertake drilling operations within metropolitan Los Angeles reflects the failure of prospectors to discover new fields in other areas.

William C. McDuffie et al propose to drill a test in the Fox Hills district in West Los Angeles adjacent to Beverly Hills.

LOS ANGELES BASIN COMPLETIONS

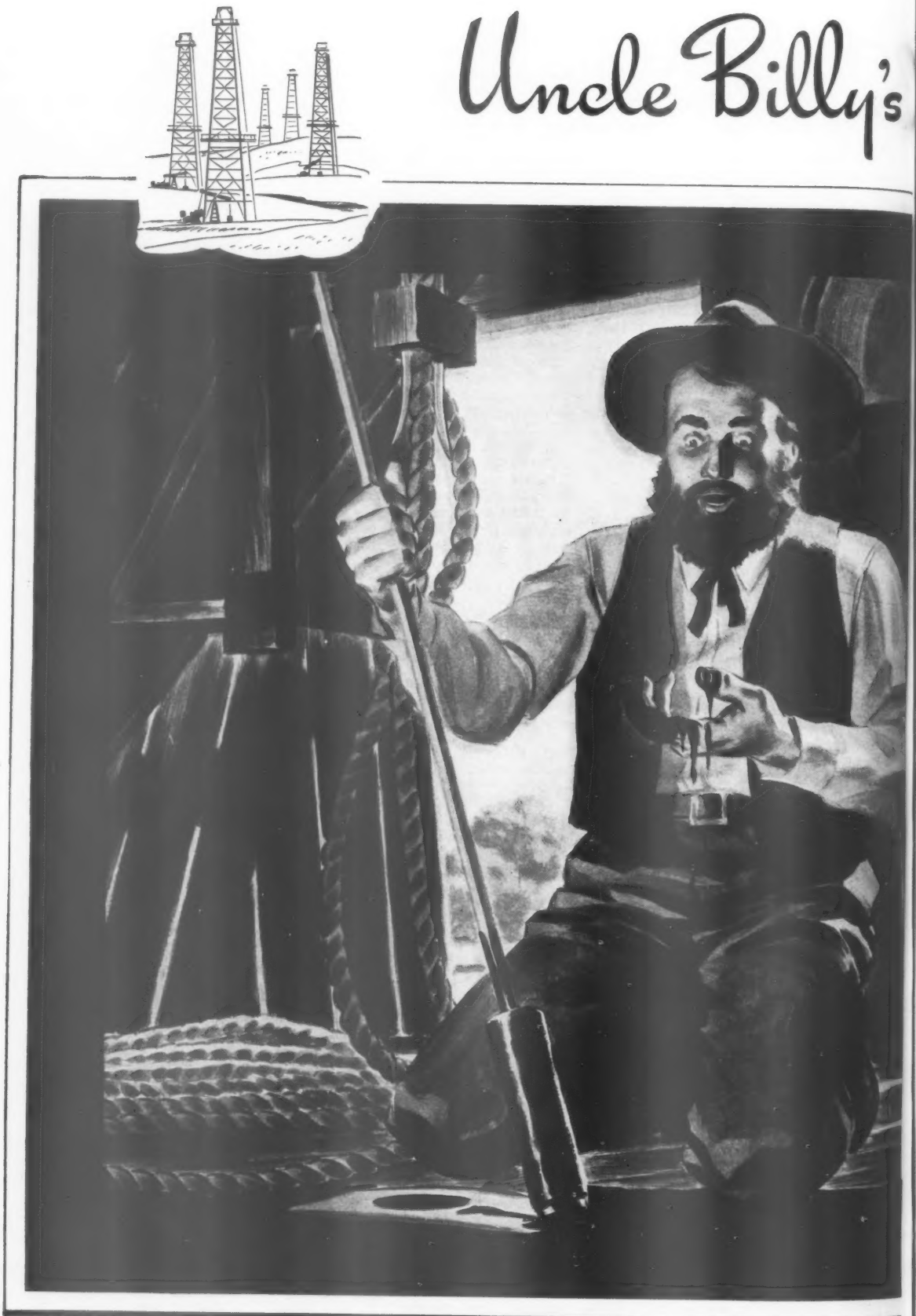
Chatsworth wildcat district, Los Angeles County: Anderson-Prichard Oil Corp.-Ramsey Pet. 1 Chatsworth Reservoir, 24-2n-17w, dry T.D. 1,645 ft.

Huntington Beach, Orange County: McVicar-Rood-McCallen 3 fee, 2-6s-11w, pumped 55 bbl., 19.1-gravity, 5 per cent cut, T.D. 3,517 ft., perf. 3,472-3,502 ft.

Wilmington, Los Angeles County: Long Beach Oil Dev. 47-W, 10-5s-13w, flowed 270 bbl., 16.2-gravity, 2 per cent cut 30/64-in. bean, pressures 80/925 lb., T.D.

(Continued on Page 82)

Uncle Billy's



's 32 Billion Dollar Dipper

Uncle Billy Smith and his crew had quit work for the week-end. Day after day for weeks, their crude tools had been pounding into the sand and shale of Oil Creek, near Titusville, Pa. They were down 69 feet, and still no strike of oil. So Uncle Billy went over on that Sunday afternoon, back in 1859, to do some figuring. Peering into the drill hole, he noticed what appeared to be water near the mouth. With an improvised dipper, he drew up some of the liquid and poured it on the ground.

It was black, gleaming crude petroleum! And Uncle Billy's dipper now is symbolic of the thousands of American producing wells that have been drilled since that historic Sunday. *They have changed the living habits of the whole world, and already have added a total of 32 billion dollars to American wealth alone!*

The National Supply Company has grown up with the fabulous oil industry. National Oil Field Machinery and Equipment has been an important factor in the development of every oil field in the world. Spang Pipe, a National product that has been made since 1840 in the first pipe mill west of the Alleghanies, is giving dependable service in oil fields, pipe lines, ships, all kinds of industries, homes, and other installations. National-built Superior Oil Field, Industrial and Marine Engines are internationally famous for their power and economy.

Products of The National Supply Company have helped America grow up . . . and will be important factors in the great peacetime expansion of tomorrow.

The National Supply Company

Executive Offices: Pittsburgh, Pa.

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TEXAS GULF COAST

Discovery Well South of Anahuac Being Completed

HOUSTON, Tex.—Preparations were being made to complete Wynn Crosby et al 1 J. E. Jackson, 15 miles south of Anahuac, in Chambers County, which is reported to have flowed 5 bbl. of distillate an hour, with an ungaged volume of gas, on a drill-stem test. Perforations were at 8,102-08 ft., with ¼-in. choke at the bottom and ⅝-in. choke at top. Working pressure was 2,450 lb. Total depth is 9,515 ft., with casing set at about 8,200 ft. At Arkansas Fuel Oil Co. 1 Annie Frankland, projected 10,500-ft. wildcat test in the R. C. Frankland Survey of Chambers County, it was said the operators might plug back and sidetrack to the north. The well was reported to have crossed a fault below the Marginulina and to have lost approximately 500 ft. of section.

More drilling is expected in the Alief area of Harris County, where Cities Service Oil Co. 1 Witcher has been completed with initial production of 40 bbl. of oil and 23 bbl. of salt water.

Fort Bend County. — Ray Ranger and Jack W. Frazier 1 E. C. Burney estate, 3½ miles south of Katy, was drilling in shale at 6,360 ft. This wildcat topped the Heterostegina at 3,350 ft., Textularia Warreni 5,030 ft., and Textularia Hockleyensis 5,757 ft. O. W. Killam Co. 1 J. R. Nesbitt, 1½ miles northwest of Fulshear, was drilling at 1,800 ft. in shale.

Harris County.—Texas Co. 1 L. M. Josey tested 4-lb. working pressure and recovered 15 ft. of distillate and oil, 276 ft. of mud, and 1,930 ft. of salt water in a 15-minute drill-stem test at 6,496-6,504 ft., with ½-in. chokes at top and bottom. At the week end it was coring at 6,711 ft. in shale. Ludeau Oil Co. 1 Dr. J. E. Ludeau, 3½ miles north of Houston, ran an electric survey from its total depth of 1,991 ft. to 480 ft. and was waiting for orders.

Jackson County. — Encouraging indications are reported to have been revealed by tests conducted at Morris Wommack et al 1 Frank Sheblock, 2 miles southwest of the Mustang Creek field. The well is at total depth of 7,009 ft. in shale. George W. Strake has spudded 1 J. M. Bennett, 1½ miles southwest of La Salle.

Jefferson County. — Texas Co. 1 J. E. Broussard et al, 7 miles southeast of Nome, was reported to have cored the Frio sand with no shows. It was drilling at 7,437 ft. in sandy shale. Humble Oil & Refining Co. and Shell Oil Co., Inc., were at a total depth of 8,810 ft. in shale and drilling plug at 1-C McFaddin trust, 5 miles southeast of La Belle field.

Washington County.—Champlin Refining Co. 1 C. D. Dallmeyer, 2 miles north of Burton, twisted off drill stem, leaving a joint of pipe, drill collar and bit in the hole. Total depth of this wildcat is 5,979 ft. An electrical survey was run from 4,756 ft.

TEXAS GULF COAST COMPLETIONS

Wildcats

Harris County: Cities Service 1 A. L. and W. C. Witcher, 3 mi. NE of Alief, 40 bbl. oil and 23 bbl. salt water through 7/64-in. choke, T.P. 1,750 lb., gas-fluid ratio 5,980, gas-oil ratio 9,424, perf. 7,926½-28½ ft., T.D. 8,711 ft., P.B. 7,973 ft.

Sun 1 Maggie Mansell, 2½ mi. N of Katy, dry at 7,775 ft.

Jackson County: Continental 1 Dr. W. J. Weeks, 3½ mi. SE of Edna, dry at 6,592 ft.

Fields

Blue Ridge, Fort Bend County: Phillips 2 E. R. Robinson, Hicks Shropshire Sur., dry at 3,786 ft.

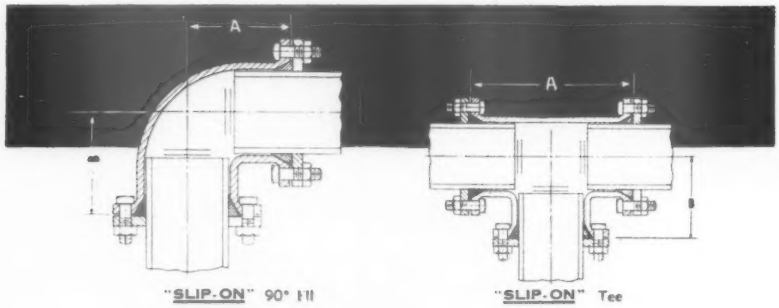
Boling, Wharton County: Danciger 2 J. B. Gary, S. F. Austin Sur., 264 bbl. through ¼-in. choke, T.P. 100 lb., C.P. 400 lb., gas-oil ratio 300, perf. 3,206-18 ft., T.D. 3,400 ft.

Caplin, Galveston County: Snowden & Freedman, McKinney & Williams Sur., A-157, 123,080 cu. ft. gas, with spray of distillate, through ⅛-in. choke, T.P. 2,400 lb., S.I. C.P. 1,800 lb., perf. 6,525-33 ft., T.D. 7,506 ft., P.B. 6,560 ft.

Clodine, Fort Bend County: Stanolind 2 Cinco ranch, John Brock Sur., A-110, 175.45 bbl. through ⅛-in. choke, T.P. 1,020 lb., gas-oil ratio 454, perf. 7,498-99 ft., T.D. 7,500 ft.

Dickinson, Galveston County: Stanolind 3 Jules Damiana, W. R. Wilson Sur., A-208, O.W.W.O., old T.D. 8,914 ft., new

(Continued on Page 83)



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SOUTHWEST TEXAS

Discovery Reported in Shallow Sand

CORPUS CHRISTI, Tex.—Continental Oil Co. 3 Albert W. West et al, a mile southwest of Oakville, in Live Oak County, produced 6 bbl. of oil an hour through ⅜-in. choke on a 16-hour test from perforations at 1,429-32 ft. Tubing pressure was 350 lb. and shut-in casing pressure 600 lb. The wildcat was shut in for storage. Locations for two wells in the new Goebel field of Live Oak County have been staked. Superior Oil Corp. spotted 1 O. A. Goebel, a quarter mile southeast of the discovery well. Henderson Coquat, who brought in the discovery, 1 W. W. Goebel, 2½ miles northeast of Oakville, spudded 2 W. W. Goebel last week, southeast of the discovery. Argo Oil Corp. 1 J. Schwartz, 4½ miles northeast of Mount Lucas, is a new Live Oak County location. Dirke Brothers and H. Coquat Co. were rigging up last week for 1 Sacks & Knight, wildcat test 8 miles east of Oakville.

Duval County.—Sun Oil Co. was preparing to spud 1 E. J. Couling heirs, in the Bennie Lee Survey 6. H. J. Porter et al 1 C. M. Robinson, 2 miles southeast of the Fitzsimmons field, twisted off the drill stem at 3,374 ft. while reaming, and is fishing.

Starr County.—New wildcat locations include Judge Brothers et al 2-B Z. Salinas, 4 miles southwest of San Roman; John O'Neill et al 1 H. Phillips, Survey 200; and Sun 1 P. L. Salinas, 2 miles southeast of the North Sun field. Sun was coring at 7,285 ft. in shale at 2-A F. Alverado, 5 miles north of the Rincon field.

Nueces County.—Texas Gulf Producing Co. has derrick up for 1 S. A. Simcik, 5 miles southwest of Corpus Christi.

Jim Wells County.—H. F. Wilcox Oil & Gas Co. has staked location for 1 E. A. Price, in J. Almond Survey 12. Humble Oil & Refining Co. was coring at 5,938 ft. at 1 Nina Adams estate, 2 miles northwest of Magnolia City.

Willacy County.—Two new locations are Sinclair Prairie Oil Co. 1 C. E. Wertz, a mile east of Raymondville, and Texas Co. 1 Yturria Land & Livestock Co., 5 miles northeast of Yturria.

Kenedy County.—Humble 1 H. F. McGill et al, 4 miles northwest of Mifflin, twisted off drill stem at 5,430 ft. and was fishing. Total depth was 7,738 ft. in shale.

Goliad County.—Sun 1 Gena Heard, Wilcox test 10 miles northwest of Goliad, was drilling ahead from 8,409 ft. in shale.

SOUTH TEXAS COMPLETIONS

Wildcats

Duval County: Cox & Hamon and C. E. Yoakum 2-B W. K. Hoffman, 9 mi. SW of Kreis field, dry at 2,206 ft.

Starr County: Sun 1-B Montalva heirs, 1 mi. SW of North Sun field, 20 bbl. oil and 36 bbl. salt water through 5/32-in. choke, T.P. 450 lb., S.I. C.P. 900 lb., gas-oil ratio 7,135, perf. 5,936-38 ft., T.D. 8,064 ft., P.B. 5,950 ft. Discovery.

Fields

Dinn, Duval County: Shield Oil Co. and H. B. Zachry 1 J. T. Dinn, J. Poitevent Sur., A-1438, dry at 3,171 ft.

Government Wells, Duval County: Magnolia 50 D.C.R.C., J. Poitevent Sur. 209. A-922, 82 bbl. pumping, perf. 2,306-16 ft., T.D. 2,316 ft.

Rincon, Starr County: Continental and W. R. Davis Co., Inc., 4-D Dee Davenport, Gregario Jiminez Sur. 530, dry at 8,585 ft., P.B. 7,271 ft.

Continental and W. R. Davis Co., Inc., 5-D M. M. Garcia, O.W.W.O., old T.D. 3,892 ft., new T.D. 3,891½ ft., 113 bbl. through ⅞-in. choke, T.P. 1,100 lb., C.P. 1,400 lb., gas-oil ratio 5,149, perf. 3,888½-91½ ft.

Washburn, La Salle County: Quintana 23 South Texas Syndicate, G. W. Van Roeder Sur. 68, A-1311, 357 bbl. through ¼-in. choke, T.P. 380 lb., gas-oil ratio 600, T.D. 5,543 ft.

Weil, Jim Hogg County: Sun 5 Weil Bros., 15 mi. S of Hebronville, 734,000 cu. ft. gas and 6 bbl. distillate through ⅛-in. choke, T.P. 1,740 lb., S.I. C.P. 1,825 lb., perf. 5,223½-47 ft., T.D. 5,350 ft., P.B. 5,005 ft.

LOWER GULF COAST COMPLETIONS

Wildcats

Jim Wells County: Humble 1 M. A. Evetts, 2 mi. N of Magnolia City, 121 bbl. through ½-in. choke, T.P. 60 lb., gas-oil ratio 373, perf. 5,260-75 ft. T.D. 6,156 ft.,

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P.B. 5,312 ft. Discovery. Named North Magnolia City field.

Kilgore Developers and Atlantic 1 Weldon, Stacey & Blake, 4 mi. E of Orange Grove, dry at 5,820 ft.

Hidalgo County: Sun 1 Dee Davenport, 1½ mi. SE of Gateway, dry at 9,003 ft.

Fields

Baldwin, Nueces County: Magnolia 11 J. C. Baldwin, B.S.&F. Sur. 165, dry at 3,275 ft.

East White Point, Nueces County: Sinclair Prairie 2 State-Nueces Bay, M. F. Briggs Sur., 161 bbl. through ⅛-in. choke, T.P. 950 lb., gas-oil ratio 550, perf. 5,815-22 ft., T.D. 6,425 ft., P.B. 5,850 ft.

Fox, Refugio County: Union Producing Co. 26 W. J. Fox et al, William Hews Sur., 16,000,000 cu. ft. gas through 7-in. casing, perf. 6,625-35 ft., T.D. 7,190 ft., P.B. 6,640 ft.

Hobson, Karnes County: Seaboard 1 F. Kiselica, E. Seguin Sur., A-10, 46 bbl. through ¼-in. choke, T.P. 1,350 lb., C.P. 1,450 lb., gas-oil ratio 25,000, T.D. 5,005 ft.

Seaboard 2 E. W. Plueckhahn, E. Seguin Sur., A-10, 227 bbl. through ¼-in. choke, T.P. 225 lb., C.P. 850 lb., gas-oil ratio 78, perf. 4,025-30 ft., T.D. 4,031 ft.

Odem, San Patricio County: Rupert Cox et al E. C. McDaniel, Juan Hart & Son Sur., A-10, dry at 5,600 ft.

Porter, Karnes County: Cox & Hamon 1 Ben Johnson, Victor Blanco Sur., A-3, 118 bbl. through 5/32-in. choke, T.P. 525 lb., C.P. 1,050 lb., gas-oil ratio (estimated) 440, T.D. 4,182 ft.

Seeligson, Kleberg County: Humble 7 King ranch-Cabeza, S.K.&K. Sur. 181, 51 bbl. distillate and 1,815,000 cu. ft. of gas, T.D. 6,948 ft.

South Caesar, Bee County: Seaboard 3 T. Slick, S. Hatch, location abandoned.

Stratton, Kleberg County: Chicago Corp. 52 G. P. Wardner, Paso Ancho de Arriba grant, A-93, dual completion, from perf. 6,138-42 ft. (Clyde sand) 156 bbl. through 5/32-in. choke, T.P. 1,580 ft., gas-oil ratio 2,724, from perf. 6,291-6,318 ft. and 6,324-36 ft. (Bertram sand) 28,500,000 cu. ft. gas open flow, with 9/10 gal. distillate per 1,000 cu. ft. gas, C.P. 2,260 lb., T.D. 8,010 ft.

PERMIAN BASIN

Fullerton Outpost Makes Good Well in Clear Fork

MIDLAND, Tex.—Fullerton Oil Co. 1 J. P. Jackson, SE NE Section 17, Block 32, Public School Land Survey, ½ mile east extension to the Fullerton pool, broke all previous potential production records for the pool when it was completed for a daily flow of 2,621 bbl. of 43.1-gravity oil from Clear Fork lime pay topped at 6,799 ft. The upper pay zone, at total depth, 7,005 ft., flowed 104 bbl. per hour natural, and after treatment with 8,000 gal. of acid, the flow was 90 bbl. per hour through 2-in. tubing. The well was then deepened to 7,270 ft., and the lower pay zone tested 36 bbl. per hour natural, and increased to 100 bbl. per hour after 8,000-gal. acid treatment. Both zones were then tested, and the official potential gage was taken. Largest previous potential was 2,185 bbl., assigned Fullerton 1-A University, Section 6, Block 13, University Survey, on the south edge of the pool.

Three miles southeast of the pool, Mid-Continent Petroleum Corp. 1-B University was staked in NW NE Section 16, Block 13, University Survey, and will test the Fullerton pay horizon. It is located on a lease acquired from the university at public auction on June 18.

In the Deep Rock area, Humble 1 Carter, SE SW Section 23, Block A-46, Public School Land, deep exploratory test, showed 8 ft. of oil staining in a core taken from 4,336-46 ft., and was drilling ahead for the lower horizons. Union Oil 1 J. D. Biles, 4½ miles northwest of the Fullerton pool, was drilling below 6,100 ft. in lime, with the pay expected at around 6,900 ft.

Pecos County.—Phillips Petroleum Co. 1 Ada Price, Section 11, Block 101, T.C.R.R. Survey, 27 miles southeast of Fort Stockton, which last week precipitated a spirited lease play in the south part of the county when it showed gas, was fishing for bit and drill collar at total depth 11,639 ft.

Standard Oil Co. of Texas 1 Douglas et al, SE SE Section 9, Block 194, G.C.&S.F. Ry. Survey, west of Yates field, was reaming hole to 8,000 ft. for a test.

Magnolia Petroleum Co. and Anderson-Prichard Oil Corp., Inc., 1 State Powell, 1 mile northeast of Apco pool, flowed sulfur water after perforating casing at 3,539 ft., 3,940 ft., and 3,942 ft., and later flowed 180 bbl. fluid per hour, with water estimated at 15 per cent.

Several important new wildcat tests were announced for the district last week.

Hockley County.—Globe Oil & Refining Co. 1 W. L. Ellwood estate was located 580 ft. from north and east lines of Labor 8, League 6, Wilbarger County School Land, in the southeast part of the county.

Yoakum County.—Texas Co. 1 J. B. Miller, NW NW Section 198, Block D, J. H. Gibson Survey, 8 miles southwest of nearest production in the Slaughter pool, and possibly may be a deep test if barren in the San Andres lime.

Pecos County.—E. M. Wahlenmaier and Siemoneit Drilling Co. 1 V. W. Crockett will be an Ordovician test, in the west corner Section 28, Block 2, H.&T.C. Ry. Survey, 4 miles northeast of the Apco pool, and 6 miles southeast of Abell pool, both producing from Ordovician pays.

Reeves County.—Standard Oil Co. of Texas 1 Texas Pacific Lands Trust is located in SE NW Section 47-57-2, T.&P. Ry. Survey, about 5 miles west of Orla. This is the second active test for the company in this county.

WEST TEXAS COMPLETIONS

Wildcats

Crockett County: Moore Bros. 1 J. S. Todd, 660 ft. from S and W, Sec. 16, Blk. YZ, E.L.R.R. Sur., elev. 2,550 ft., San Andres 1,945 ft., crinoidal 6,790 ft., Simpson 7,180 ft., Ellenburger 7,645 ft., dry, T.D. 7,903 ft.

Sterling County: B. C. Mann 1 W. D. Atkinson, 1,980 ft. from S and E, Sec. 122, Blk. 6, H.&T.C. Sur., elev. 2,425 ft., Blaine lime 1,683 ft., San Angelo 1,953 ft., San Angelo sand 2,356-2,401 ft., dry, T.D. 2,500 ft.

Ward County: Phillips Pet. 1-B University, NW NW Sec. 28, Blk. 16, University Sur., dry, T.D. 5,020 ft.

Fields

Byrd, Ward County: Stanolind Oil & Gas 4-A Dudley A. Wood, 660 ft. from NE, 1,986 ft. from SW, Sec. 34, Blk. 34, H.&T.C. Sur., pump 168 bbl., pay 2,645 ft., shot 80 qt., T.D. 2,675 ft.

Cedar Lake, Gaines County: George P. Livermore, Inc., 4 Jones & Lane, SW SE Sec. 2, Blk. C-30, Public School Land, swabbed 513 bbl., lime pay 4,750 ft., shot 254 qt., T.D. 4,821 ft.

Stanolind Oil & Gas 8 Mrs. M. L. Bremont, NW NE Sec. 3, Blk. C-30, Public School Land, elev. 3,084 ft., swabbed 431 bbl., lime pay 4,685 ft., T.D. 4,830 ft.

Fullerton, Andrews County: Fullerton Oil 1 J. P. Jackson, SE NE Sec. 17, Blk. A-32, Public School Land, elev. 5,332 ft., flow 2,621 bbl., Clear Fork lime pay 6,799 ft. acid 16,000 gal., T.D. 7,270 ft., ½ mi. E extension.

Goldsmith, Ector County: Stanolind Oil & Gas 1-C H. E. Cummins, NE SE NW Sec. 32, Blk. 45-1-N, T.&P.R.R. Sur., pump 54 bbl., lime pay 4,245 ft., acid 7,000 gal., T.D. 4,312 ft.

Foster, Ector County: Stanolind Oil & Gas 42-B E. F. Cowden, 330 ft. from E, 1,650 ft. from S, Sec. 10, Blk. 43-1-S, T.&P. R.R. Sur., flow 386 bbl., pay 4,030 ft., shot 913 qt., T.D. 4,365 ft.

Mascho, Andrews County: Phillips Pet. 1-C University, SE NE Sec. 4, Blk. 10, University Sur., I.P. 189 bbl., lime pay 4,274 ft., acid 1,000 gal., T.D. 4,612 ft.

Sand Hills, Crane County: Lario Oil & Gas 1-D J. B. Tubb, 660 ft. from N and E, Sec. 8, Blk. 32, Public School Land, elev. 2,620 ft., flow 1,480 bbl., lime pay 4,260 ft., T.D. 4,530 ft.

Slaughter, Hockley County: Humble Oil & Ref. 7 W. A. Coons, 7,293 ft. from N, 3,021 ft. from W, Sec. 11, Blk. X, Public School Land, flow 1,408 bbl., lime pay 4,900 ft., acid 10,000 gal., T.D. 5,040 ft.

Texas Co. 140 Bob Slaughter, 510 ft. from S and E, Lab. 68, Lge. 40, Maverick County School Land, flow 1,896 bbl., lime pay 4,875 ft., acid 13,000 gal., T.D. 5,015 ft.

Spencer, Ward County: Stanolind Oil & Gas 1 C. L. Monroe, 660 ft. from NW, 1,992 ft. from SW, Sec. 52, Blk. 34, H.&T.C. Sur., elev. 2,627 ft., pump 54 bbl., pay 2,765 ft., shot 56 qt., P.B. to 2,786 ft. from T.D. 2,969 ft.

Wasson, Gaines County: Amerada Pet. 2 R. A. Cox, 555 ft. from N, 1,875 ft. from W, Sec. 380, Blk. G, C.C.S.D.&R.G.N.G. Sur., flow 573 bbl., lime pay 4,912 ft., acid 5,000 gal., T.D. 4,955 ft.

Wasson, Yoakum County: DeKalb Agric. Ass'n. 9 Annie Armstrong, 1,875 ft. from N, 766 ft. from E, Sec. 889, Blk. D, J. H. Gibson Sur., dry, T.D. 5,125 ft.

DeKalb Agric. Ass'n. 10 Annie Armstrong, 2,085 ft. from S, 767 ft. from E, Sec. 889, Blk. D, J. H. Gibson Sur., elev. 3,536 ft., dry, T.D. 610 ft.

Drlg. & Explor. 1-A Tannehill Bros., NE NE Sec. 774, Blk. D, J. H. Gibson Sur., pump 192 bbl., pay 5,000 ft., acid 12,000 gal., shot 400 qt., T.D. 5,245 ft.

Plymouth Oil 3-C Ruth Bennett, 660 ft. from N, 1,830 ft. from W, Sec. 630, Blk. D, J. H. Gibson Sur., elev. 3,591 ft., flow 177 bbl., lime pay 5,215 ft., acid 8,000 gal., T.D. 5,295 ft.

PANHANDLE COMPLETIONS

Gray County: Cities Service 7 Noel, pump

(Continued on Page 79)

DOWNSTROKE
One-half of rubber slides upward, giving exceptionally large fluid passage between rubbers.

UPSTROKE
Rubber half drops back into position, closing fluid passage and lifting load.

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SAVE MANPOWER SAVE MATERIALS

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KANSAS

Zenith and Peace Creek Joined by Good Wells

ONE of the most important recent developments in Kansas was the joining of the Peace Creek and Zenith Viola lime pools. While the Corporation Commission has asked another 30 days before accepting the recommendation made by the nomenclature committee, that the two pools be united and prorated as one, operators and geologists have long been of the opinion that production is from a common source, or stratigraphic trap. Two completions were reported last week, one on either side of the section line of Township 23s and 24s, Range 10w. Recent completions near the borders of the two areas have been larger than average for the fields.

Pratt County.—The Carmi and North Iuka pools were recently united and called Carmi. This area at present is the most active in the state. Five completions were reported there last week, extending the north and south boundaries ¼ mile and broadening the central area.

Stafford County.—A new Arbuckle pool was in sight at Skelly Oil Co. 1 Campbell, SW SE SW 34-24-15w, which had a hole full of oil from the Arbuckle dolomite topped at 4,419 ft. Location is in the southwest part of the county and about 3 miles north of Cities Service Oil Co.s 1 Grunder.

KANSAS COMPLETIONS

Wildcats

Barber County: Continental and Sinclair Prairie 1 Marchel, SE SE SE 2-32-13w, dry, T.D. 4,565 ft., Lansing 3,749 ft., Viola 4,546 ft., show black oil 4,293 ft.

Edwards County: Stanolind 1 Ramsey, SW SW SE 3-24-16w, dry, T.D. 4,249 ft., Lansing 3,730 ft., Simpson 4,200 ft., Arbuckle 4,236 ft.

Broderich & Gordon 1 Miller, SE SW 5-26-18w, dry, T.D. 5,085 ft., Lansing 4,052 ft., Mississippi lime 4,748 ft., Viola 4,805 ft., Simpson 4,971 ft., Arbuckle 5,059 ft.

Ellis County: Darby Pet. 1 Spilker, SW SW SW 1-13-20w, dry, T.D. 3,852 ft., Lansing 3,462 ft., Arbuckle 3,830 ft.

B & R Drlg. Co. 1 Leiker, N½ NW NW 14-15-18w, pumped 114 bbl., Lansing 3,292-98 ft., T.D. 3,622 ft., fluid level 1,600 ft., gravity 39.8, discovery of Leiker sand.

Leavenworth County: Chas. Miller 1 Blinn, NW NW SE 12-11-20e, dry, T.D. 1,556 ft., Mississippi lime 1,430 ft.

McPherson County: Chas. M. Coats 1 Elbe, SE SE SE 19-18-5w, dry, T.D. 3,957 ft., chat 3,544 ft., Misener 3,783 ft., Viola 3,803 ft., Simpson sand 3,839 ft., Arbuckle 3,925 ft.

Rice County: Nelson Drlg. 1 Perry, NW NW SE 11-19-6w, dry, T.D. 3,445 ft.

Rooks County: Carter Oil 1 Bigge, SW SW 10-7-18w, dry, T.D. 3,591 ft., Lansing 3,096 ft., Arbuckle 3,516 ft.

Chas. M. Coats 1 Moore, SE NW 10-7-17w, dry, T.D. 3,339 ft., Topeka 2,697 ft., Lansing 2,947 ft.

Russell County: Northern Ordnance 1 Colliver, NE NE 29-12-12w, dry, T.D. 3,560 ft., Lansing 2,815 ft., Viola 3,280 ft., Simpson 3,449 ft., Arbuckle 3,494 ft.

Russell County: Ohio Oil Co. et al 1 Strecker, S½ SE SW 21-15-14w, pumped 287 bbl., Arbuckle 3,336-56 ft., gravity 48, discovery at Strecker pool.

Fields

Ainsworth, Barton County: Derby Oil and Crow Drlg. 1-A Gory, NW SE SW 10-17-13w, dry, T.D. 3,400 ft., Arbuckle 3,347 ft.

Beaumont, Greenwood County: K. T. Wiedemann 2 Baldwin, SE NE NE 12-27-8e, dry, T.D. 2,884 ft.

K. T. Wiedemann 3 Temple, SE SE NE 26-27-8e, pumped 15 bbl. Mississippi lime 2,533-38 ft.

Burrton, Harvey County: J. J. Lynn 1 Harvely, SW SE 17-23-3w, flowed 200 bbl., Mississippi lime 3,271-3,364 ft.

Carmi, Pratt County: Ohio Oil 1 Honeman, SW SE NW 31-26-12w, flowed 66 bbl. in 1 hr., Arbuckle 4,295-4,318 ft.

Mid-Continent 2 Knop, SW NE NE 25-26-13w, swabbed 33 bbl. in 4 hr., Arbuckle 4,316-33 ft.

Hollow Drlg. 3 Harrel, SW SE NE 36-26-13w, flowed 25 bbl. an hr., Arbuckle 4,311-27 ft.

Champlin Ref. 3 Stueder, SW SW SW 29-26-12w, swabbed 25 bbl. in 2 hr. before acid, Arbuckle 4,303-12 ft.

Shell 1 Petrowsky, SW NW SW 30-26-12w, flowed 329 bbl. in 7 hr., Arbuckle 4,288-4,306 ft.

Dayton N, Phillips County: Tom Allen et al 1 Culbertson, NW NE 13-2-19w, pumped 99 bbl., Lansing 3,366-3,413 ft.

Deichman, Cowley County: Mead Prod. 1-A Orr, SE NE SW 23-31-4e, dry, T.D. 2,996 ft.

Dopita, Rooks County: Bishop Oil 1 Hagen, NE NE 26-8n-18w, dry, T.D. 3,460 ft., Arbuckle 3,443 ft.

Hall-Gurney, Russell County: Cities Service 2-B March, S½ SE SE 30-14-12w, 1,046 bbl., Gorham 3,104-08 ft.

Cities Service 12-A Strecker, NE SE 35-14-14w, dry, T.D. 3,215 ft., Arbuckle 3,183 ft.

Hunter, Saline County: Deep Rock 2 Threlkeld, NE SE NE 19-16-1w, pumped 35 bbl., Mississippian chat 2,709-29 ft., T.D. 2,748 ft.

Kraft-Prusa, Barton County: Appleman 2 Stueder, NE SE 10-17-11w, dry, T.D. 3,3[illegible] ft.

Laton, Rooks County: Bay Pet. 1 Swisher, S½ SW SW 34-8-16w, pumped 278 bbl., Lansing 3,099-3,140 ft.

Lost Springs, Marion County: Derby Oil et al 1-A Bernhardt, W½ NE NE 16-17-4e, pumped 100 bbl., chat 2,339-67 ft.

McLouth, Jefferson County: Sherrod et al 3 Bower, SE SW SE 5-10-20e, pumped 65 bbl., Mississippi lime 1,652-54 ft.

Morel, Graham County: Continental and Cities Service 4 Morel, NW SW SE 15-9-21w, swabbed 188 bbl. in 4 hr., Arbuckle 3,707-14 ft.

Richardson, Stafford County: W. N. Bartlett 1 Riley, E½ SE NE 19-22-11w, dry, T.D. 3,665 ft., Arbuckle 3,635 ft.

Rock, Cowley County: Stelbar Oil 2-A Wilson, SW SW NE 11-30-4e, dry, T.D. 2,925 ft.

Silica, Rice County: W. C. Emrich 1-A Linville, NE NW NE 2-20-10w, dry, T.D. 3,311 ft., Arbuckle 3,302 ft.

Cities Service 1-B Doll, SW NE SW 19-19-10w, 3,000 bbl., Arbuckle 3,291-98 ft.

Stoltenberg, Ellsworth County: Skelly 2 Harbacek, SE NE 7-16-10w, dry, T.D. 3,404 ft., Arbuckle 3,393 ft.

Turkey Creek, Barber County: Superior Oil Co. 1 Tucker, SW SW SE 20-30-15w, dry, T.D. 4,770 ft., Arbuckle 4,718 ft.

Williamson, Russell County: Stanolind 3 Boxberger, SW SW NW 10-14-14w, pumped 400 bbl., Lansing 2,983-86 ft., 3,005-38 ft., T.D. 3,255 ft.

Zenith-Peace Creek, Reno County: Skelly 3 Johnson, NE NE 6-24-10w, flowed 268 bbl. in 7 hr., Viola 3,688-3,719 ft.

Magnolia 2 Johnson, SW SE SW 32-23-10w, flowed 117 bbl., Viola 3,672-78 ft., 3,688-3,701 ft., T.D.

MISSOURI

ST. JOSEPH, Mo. — O. R. Newcomer and the Nebraska Producing & Refining Co. are drilling 1 P. R. Low, a wildcat test to the Bartlesville sand in SW NW NW 9-64n-39w, southeast of Tarkio in Atchison County, Missouri. Newcomer farmed out the lease from the Nebraska company. This is his second attempt to extend production in the Tarkio pool, opened by the Cities Service Oil Co. last December. He had a dry hole 2 miles south of the producer and now has moved a mile east of his first location. Another operator recently drilled a dry hole 3½ miles southwest of the producer. The Newcomer test has elevation of 979 ft. and drilling was last reported below 1,200 ft. Bartlesville sand should be around 1,450 ft. A light portable rotary is being used and Claude McQueen of Rushville, Mo., is the contractor.

APPALACHIAN FIELDS

Salt Water Struck in Second Test of Clarion Co. Lens

PITTSBURGH, Pa.—The second test of a new oil lens which was reported good for 5 bbl. a day in Monroe Township, Clarion County, was blighted when a large head of salt water intruded. In Armstrong County there was a fair gas well in the shallow sands. In West Virginia a good gas well was reported in Kanawha County and in Raleigh County, there was a large gas well in the Maxton sand. No new oil was reported either in Pennsylvania or West Virginia.

SW. PENNSYLVANIA COMPLETIONS

Armstrong County, Cowanshannock Township: Sagamore Gas Co. 1 J. C. McCausland, 60,000 cu. ft. gas, Bradford sand gas at 3,325-35 ft., T.D. 3,420 ft.

Gilpin Township: Carnegie Natural Gas Co. 4 Peter Klingensmith, 1,347,000 cu. ft. gas, Thirty-foot sand 1,212 ft., gas 1,269 ft., T.D. 1,273 ft.

Kiskiminitas Township: Dome Gas Co. 1 Ellis Schaffer, 10,000 cu. ft. gas from Thirty-foot sand, T.D. through Bradford sand 3,700 ft.

Fayette County, Menallen Township: Greensboro Gas Co. 2 J. W. Jeffries, dry, through Fifth sand, T.D. 2,599 ft.

Greene County, Washington Township: R. E. Orrill 1 Earl Morris, dry, gas sand 1,541-1,608 ft., T.D. 1,635 ft.

Washington County, North Bethlehem Township: George K. Gray & Son 1 Samuel Weir, drilled deeper from 1,398 ft., dry, T.D. 1,741 ft.

WEST VIRGINIA

Boone County.—In the Peytona district, Owens, Libby-Owens Gas Department topped the Oriskany sand in 655 Bull Creek Coal Land Co., at 4,576 ft. after a section of 99 ft. of Corniferous lime. There is a gas gage of 53,000 cu. ft. and a show of gas at 4,601 ft.

Tucker County.—In the Dry Fork district, Ohio Oil Co. has reached 6,350 ft., in gray shale in the test on the Kaemmerling tract.

Gilmer County.—In the Center dis-

trict, Hope Natural Gas Co. is drilling at 1,426 ft. in a deep test on the Susan Stump farm, with a showing of 295 cu. ft. gas from the Salt and Maxton sands.

Wirt County.—Columbian Carbon Co. is drilling at 2,516 ft. in the Oriskany test on the Virgie Mason farm in the Tucker district.

Wood County.—The two Oriskany tests of the United Fuel Gas Co. in the Slate district reached the following depths: 5263 F. R. Hart, 2,190 ft.; 5264 J. A. Goudy, 1,787 ft.

WEST VIRGINIA COMPLETIONS

Calhoun County, Sherman district: South Penn Gas 8 F. E. Rothlisberger, drilled deeper, 54,000 cu. ft. gas, Injun sand 2,287 ft.

Clay County, Henry district: Virginian Gasoline & Oil Corp. V 1334 P. D. Summers, 10 bbl., Injun sand, T.D. 2,014 ft.

Raleigh County, Slab Fork district: Godfrey L. Cabot, Inc., 1084 Beaver Coal Co., 103,000 cu. ft. gas after acidizing with 1,000 gal., Big lime 2,873 ft., gas 3,132-43 ft., R.P. 205 lb., T.D. 3,193 ft.

Town district: Godfrey L. Cabot, Inc., 1083 Beaver Coal Co., 2,324,000 cu. ft. gas, Maxton sand 2,213 ft., gas 2,275-88 ft., R.P. 320 lb. 24 hr., T.D. 2,303 ft.

Putnam County, Pocatalico district: Godfrey L. Cabot, Inc., 1098 Putnam, 5,840,000 cu. ft. gas, Big lime 1,653 ft., gas 1,709-15 ft., gas 1,740-45 ft., R.P. 775 lb. 12 hr., T.D. 1,752 ft.

Ritchie County, Clay district: Pittsburgh & West Virginia Gas Co. 6136 John P. Thomas, drilled deeper, dry, Maxton sand 1,621-66 ft., Big lime 1,718-73 ft., Injun 1,773-1,903 ft., will test oil show in Maxton sand, T.D. 1,960 ft.

Wyoming County, Center district: Godfrey L. Cabot, Inc., 1070 C. C. Sharp, 168,000 cu. ft. gas, T.D. 2,153 ft.

ORISKANY GAS FIELDS

Jackson County, Ripley district: West Virginia Gas Corp. 1 E. O. Fisher, 3,285,000 cu. ft. gas, Corniferous lime 5,058 ft., Oriskany 5,157 ft., R.P. 1,060 lb. 13 hr., T.D. 5,189 ft.

West Virginia Gas Corp. 1 O. W. Smith, 1,711,000 cu. ft. gas, Corniferous lime 4,873 ft., Oriskany 4,975 ft., shot 4,974-84 ft., T.D. 5,014 ft.

ILLINOIS

Clay City Well Makes Best Flow of Year

MATTOON, Ill.—The largest initial producer of the year in Illinois was completed in the past week in the west side of the Clay City pool. The well made a maximum flow of 2,650 bbl. in 24 hours and averaged 2,000 bbl. a day for 8 days.

Forty new operations were started during the week including these wildcats: National Refining Co. 1 Clement Ulmet, SE SW SW 16-4n-3w, Bond County; Wiser Oil Co. 1 Jantzen, NW SW NE 33-2n-2w, Clinton County; Texas Co. 1 Eiffert, NW SE NW 31-4s-1w, Perry County; S. D. Walker et al 2 Guy Sutton, NE SE SE 36-14n-7e, Coles County; Robinson & Puckett 1 F. Barnick, NE NW NW 11-5n-6e, Clay County; Tide Water 1 G. I. Danks, NE NW SW 29-6n-5e, Effingham County; Bell Brothers 1 L. G. Yates, E½ NE NW 32-2n-7e, Wayne County; Stanolind Oil & Gas Co. 1 J. H. Arnold, SW NW SW 23-1n-9e, Wayne County: Ohio Fuel Supply Co. and Bauman 1 Thomas Long, C NE SW 13-2s-6e, Wayne County; Mabee Oil & Gas Co. 1 Cowling, SW NE SW 20-2s-14w, Wabash County.

ILLINOIS COMPLETIONS

Wildcats

Clay County: E. P. Corley 1 Pemberton, NE NW SW 28-5n-5e, dry at 2,608 ft., Glen Dean 2,030 ft., Golconda 2,099 ft., Barlow 2,191 ft., Cypress 2,226 ft., Paint Creek 2,310 ft., Paint Creek sand 2,322 ft., Benoist 2,378 ft., Renault 2,420 ft., Aux Vases 2,440 ft., Ste. Genevieve 2,484 ft., Fredonia 2,530 ft.

Kilpatrick 1 Williams, NE SE NW 20-5n-5e, dry at 2,567 ft., Glen Dean 2,004 ft., Golconda 2,074 ft., Barlow 2,161 ft., Cypress 2,195 ft., Paint Creek lime 2,340 ft., Benoist 2,356 ft., Renault 2,380 ft., Aux Vases 2,404 ft., Ste. Genevieve 2,452 ft., Fredonia 2,470 ft., McClosky 2,504-07 ft.

Edwards County: Illinois Producers 1 H. C. Barber, E½ NE SW 4-1n-10e, pumped 107 bbl. in 19 hr., then 83 bbl. in 24 hr., McClosky lime 3,272-76 ft., and 3,285-88 ft., T.D. 3,301 ft., acidized. A pool opener.

Franklin County: Sohio Oil 1 O. D. Flatt, NW NW SE 19-6s-2e, dry at 2,802 ft., Menard 1,812 ft., Waltersburg 1,888 ft., Vienna 1,942 ft., Tar Springs 1,955 ft., upper Glen Dean 2,050 ft., lower Glen Dean 2,084 ft., Hardinsburg 2,119 ft., Golconda 2,197 ft., Barlow 2,297 ft., Cypress 2,310 ft., Paint Creek 2,424 ft., Renault 2,495 ft., Aux Vases 2,505 ft., Aux Vases sand 2,548 ft., Ste. Genevieve 2,635 ft., Rosiclare 2,658 ft., Fredonia 2,733 ft.

Hamilton County: Texas 1 J. McMahon, SW NE SW 24-6s-7e, dry at 3,387 ft., upper Glen Dean 2,607 ft., lower Glen Dean 2,627 ft., Golconda 2,722 ft., Barlow 2,871 ft., Cypress 2,850 ft., Weiler 2,907 ft., no Benoist, upper Renault 3,113 ft., Aux Vases 3,200 ft., Ste. Genevieve 3,227 ft., Levias 3,267 ft., McClosky 3,296-3,373 ft.

Jefferson County: Nash Redwine 1 Benoist NE SE SE 26-1s-3e, dry at 2,939 ft., Menard 2,038 ft., Tar Springs 2,187 ft., upper Glen Dean 2,266 ft., lower Glen Dean 2,286 ft., Hardinsburg 2,306 ft., Golconda 2,354 ft., Barlow 2,463 ft., Cypress 2,498 ft., Paint Creek 2,590 ft., Benoist 2,634 ft., Benoist sand 2,649 ft., upper Renault 2,690 ft., lower Renault 2,703 ft., Aux Vases 2,708 ft., Ste. Genevieve 2,778 ft., Rosiclare 2,800 ft., Fredonia 2,833 ft., McClosky 2,901-03 ft., St. Louis 2,907 ft.

Lawrence County: Smith & Nye 1 Buchman, NW NE SE 11-2n-12w, dry at 1,907 ft., Benoist 1,733-45 ft., Renault 1,767-74 ft., Ste. Genevieve 1,804 ft., McClosky 1,847-52 ft. and 1,857-63 ft., and 1,898-1,901 ft.

Montgomery County: W. R. Holmes 1 H. Sewing, SW SE NW 29-8n-5w, dry at 720 ft.

St. Clair County: G. A. Morris 1 Press, SE SW NW 34-1s-8w, dry at 141 ft.

Wayne County: New Penn Development 1 fee, S½ NW SE 29-2s-9e, dry at 3,380 ft., upper Glen Dean 2,684 ft., lower Glen Dean 2,798 ft., Barlow 2,887 ft., Cypress 2,936 ft., Benoist 3,078 ft., Renault 3,123 ft., Aux Vases 3,195 ft., Ste. Genevieve 3,245 ft., Fredonia 3,303 ft., no McClosky lime.

Pure 1 William Hough, C NW NW 13-2n-8e, dry at 3,115 ft., Glen Dean 2,429 ft., Barlow 2,593 ft., Ste. Genevieve 2,973 ft., McClosky 3,043-56 ft., 3,081-86 ft.

White County: E. W. Kubat 1 Johnson, NW SW NW 19-4s-11e, pumped 35 bbl. sand 1,981-2,036 ft., shot. A pool opener.

Fields

Barnhill, Wayne County: Robinson-Puckett 8 Hornick-Murphy, C SE SE 34-2s-8e, pumped 70 bbl., McClosky lime 3,409-17 ft., acid., T.D. 3,437 ft.

Bible Grove, Effingham County: Texas 7 C. Nodler, NW NE NW 3-5n-7e, pumped 45 bbl., Weiler or Cypress sand 2,538-45 ft., shot, T.D. 2,547 ft.

Birds pool, Crawford County: Ohio 25 J Conrad, SW SW SW 15-5n-11w, dry at 1,805 ft., St. Louis lime top 1,700 ft.

Blairsville, Hamilton County: Texas 3 D. S. Ledbetter, SW NE NW 21-4s-7e, pumped 61 bbl. oil and 12 bbl. water, Aux Vases sand 3,300-26 ft., shot, T.D. 3,337 ft.

Boulder, Clinton County: Texas 10 Price-Gray, C SE SE 35-3n-2w, 2,514,000 cu. ft. gas, Devonian lime top 2,558 ft., T.D. 2,721 ft., P.B. to 2,678 ft. and cleaned out.

Bridgeport, Lawrence County: Alford 2 Seed, NE SE NW 29-3n-12w, pumped 35 bbl., Benoist sand 1,914-32 ft., shot, T.D. 1,935 ft.

Ed Dieck 4-A Guttridge, SW SE SW NW 29-3n-12w, pumped 100 bbl., Benoist sand 1,974-92 ft., shot, T.D. 1,998 ft.

Clay City, Wayne County: Pure 2 T. R. Michael-A, SE SE NW 35-2n-7e, McClosky lime 3,043-59 ft., T.D., flowed an average of 2,000 bbl. per day, natural, for 8 days before completion, with a maximum of 2,650 bbl. on the first day.

East Centerville, White County: B. M. Heath 1 Detroy, SE SW SW 18-4s-10e, dry at 3,274 ft., Menard 2,394 ft., Tar Springs 2,515 ft., upper Glen Dean 2,592 ft., lower Glen Dean 2,624 ft., Hardinsburg 2,672 ft., Golconda 2,731 ft., Barlow 2,867 ft., Cypress 2,885 ft., Benoist sand 3,024 ft., lower Renault 3,102 ft., Aux Vases 3,118 ft., Ste. Geneviev 3,146 ft., no McClosky.

Fairfield, Wayne County: Pure 1 F. S. Harvey, C NW NE 11-2s-7e, dry at 3,390 ft., Aux Vases 3,188-90 ft., McClosky 3,285-89 ft., 3,340-45 ft.

Flora, Clay County: National Refining 1 Goodenough, E½ SE SE 14-3n-6e, pumped 65 bbl. oil, 10 bbl. water, McClosky lime at 2,962-64 ft., 2,977-84 ft., acid., T.D. 2,984 ft.

Friendsville, Wabash County: W. H. Nichols 1 Langelsen, NE SW SW 26-1n-13w, dry at 1,733 ft. No tops available.

Iola, Clay County: Texas 2 Behrman-Kidwell, SE SW NW 15-5n-5e, pumped 26 bbl. oil, 2 bbl. water, Aux Vases sand 2,356-59 ft., shot, T.D. 2,359 ft.

Kingwood 1 Maud Danks, SE NE NE 14-5n-5e, pumped 68 bbl. oil, 3 bbl. water, McClosky lime 2,466-2,504 ft., including breaks, acid., T.D. 2,508 ft.

Mount Carmel, Wabash County: Shell 8 P. J. Hein, SE SE SE 18-1s-12w, pumped 2 bbl. oil, 3½ bbl. water, Cypress sand 2,030-43 ft., shot, T.D. 2,047 ft.

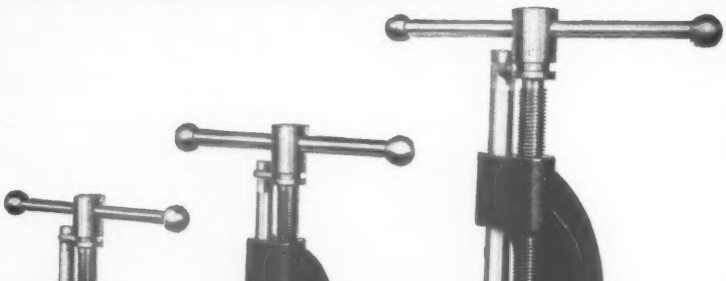
Superior 1 Viehman, SE SE NE 8-1s-12w, pumped 239 bbl. from two pays, Cypress sand at 2,012-24 ft. and McClosky lime at 2,330-36 ft., latter acidized, T.D 2,336 ft.

New Harmony, White County: Mohawk Drilling 1 H. C. Ford et al, NE NE SW 5-5s-14w, dry at 3,003 ft., lower Kincaid 1,910 ft., Menard 2,124 ft., upper Glen Dean 2,366 ft., lower Glen Dean 2,373 ft., Golconda 2,513 ft., upper Renault 2,811 ft., lower Renault 2,849 ft., Aux Vases 2,861 ft., Ste. Genevieve 2,908 ft., McClosky 2,985-87 ft. and 2,990-3,002 ft.

North Maunee, White County: Continental 2 Harry Brown, NE NW SE 25-5s-10e, dry at 3,040 ft., Menard 2,190 ft., lower Menard 2,219 ft., Tar Springs 2,345 ft., upper Glen Dean 2,421 ft., lower Glen Dean 2,444 ft., Golconda 2,529 ft., Barlow 2,644 ft., Cypress 2,665 ft., Benoist 2,819 ft., Renault 2,884 ft., Aux Vases 2,947 ft., Ste. Genevieve 2,969 ft., McClosky 2,978-82 ft.

North Noble, Richland County: Pure 1 Fred

(Continuued on Page 79)



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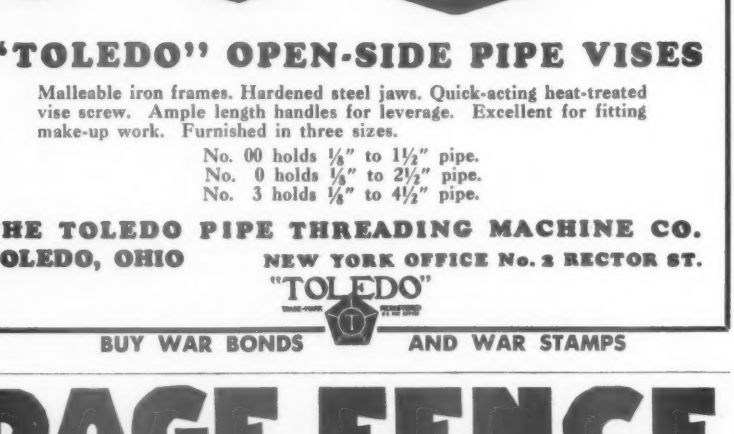

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MICHIGAN

Rapid Development Planned In Newaygo County Area

SAGINAW, Mich.—Michigan oil operators continued their extensive search for new fields last week without result and reported as dry holes nine of the 17 tests completed during the week. Five of the failures were wildcat tests while five oil and three natural-gas producers were completed. Activity was scattered through 10 counties.

Ohio Oil Co. meanwhile prepared for extensive development of its acreage in Norwick Township, Newaygo County, obtaining five permits for tests in Sections 20, 21, and 29. A dozen other permits also were issued by the state Conservation Department including four for Bangor and Geneva townships, Van Buren County, and single projects in Clinton, Gladwin, Gratiot, Ottawa, Allegan, Mecosta and Arenac counties.

Sun Oil Co. completed the best well of the week, reporting a 146-bbl. flow the first 19 hours from B-1 Stein-Wilcox in Osceola Township, Osceola County. Gulf Refining Co. added two more producers in the Kawkawlin pool, Bay County. Continuing development of the Cranberry Lake gas field in Summerfield Township, Clare County, Taggart Bros. Co. reported two more producers.

MICHIGAN COMPLETIONS

Allegan County, Ganges Township: Fisher-McCall Oil & Gas 1 Starring estate, SE NE SE 10-2n-16w, wildcat test, dry, T.D. 1,280 ft.

Bay County, Kawkawlin Township: Gulf 1 Bedell, C S½ NE NE 33-15n-4e, pumped 85 bbl., acidized, T.D. 2,935 ft.

Gulf 2 Dennis McNally, C N½ SW SE Sec. 28, pumped 70 bbl., acidized, T.D. 2,938 ft.

Clare County, Summerfield, Township: Taggart Bros. S-7 State-Sterling, C NE 17-20n-5w, 2,100,000 cu. ft. natural gas, T.D. 1,273 ft.

Taggart Bros. S-9 State, C SE Sec. 8, 2,600,000 cu. ft. natural gas, T.D. 1,297 ft.

Gladwin County: Bentley Township: Sun 1-B State-Bentley, SE NW NW 21-17n-2e, pumped 8 bbl., acidized, T.D. 3,610 ft.

Hay Township: T. F. Caldwell, Inc., 1 Caldwell-State-Hay, C W½ SW NE 21-18n-1e, dry, T.D. 3,640 ft.

Isabella County, Coldwater Township: Rowmor-Leonard-Bartlett 1 Latham, C S½ SE SE 26-16n-6w, wildcat, dry, T.D. 3,897 ft.

Rolland Township: Leslie T. Barber 1 George W. Cairl, et al, C S½ SE SE 30-13n-6w, wildcat, dry, T.D. 3,678 ft.

Mecosta County, Chippewa Township: Sun 1 John McCormack, C S½ SE SE 23-16n-8w, wildcat, dry, T.D. 3,850 ft.

Missaukee County: Aetna Township: Cities Service Oil Co. 1 C. DeYoung-G. Apps, C S½ SW NE 26-22n-6w, pumped 40 bbl., T.D. 3,845½ ft.

Newaygo County, Norwich Township: Ohio Oil 1 Vaughan-Barton-Pillsbury, C NE 29-15n-11w, 2,500,000 cu. ft. natural gas, T.D. 1,156 ft.

Osceola County, Osceola Township: Sun B-1 Stein-Wilcox, communitized, C N½ NW SE 27-18n-8w, 146 bbl. first 19 hr., flowing natural, T.D. 3,706 ft.

(Continued on Page 78)

EASTERN TEXAS

Several Wildcats Nearing Critical Levels

DALLAS, Tex. — Several wildcat tests reaching interesting depths command the attention in East Texas. In Van Zandt County, Hunt Oil Co. 1 L. Parker, J. Sparks Survey, 3½ miles northeast of Edgewood, was drilling in Georgetown lime below 5,500 ft., topping it at 4,980 ft. The test is headed for the Paluxy sand.

Hunt County.—Humble Oil & Refining Co. 1 F. F. Graham, Smackover lime test in Elam Survey, west of Weiland pool, was drilling brown lime at 9,377 ft. Top of the Smackover was logged at 9,017 ft., with no shows reported.

Roberston County. — Magnolia Petroleum Co. 1 Pauline Doremus, Sam Kinney Survey, topped Pettit at 6,690 ft., with Travis Peak logged at 6,895 ft., and was drilling in hard sandstone at 6,945 ft., with no shows.

Franklin County.—L. A. Grelling, Jr., 1 J. P. Stanley, Lake Franklin area, was drilling below 8,335 ft. with stains and gas odor in cuttings reported from 7,885-7,900 ft.

Rusk County.—Trentman Oil Co. 1 Evans, T. J. Hapgood Survey, 3½ miles northeast of New Salem, topped Austin chalk at 3,962 ft., and was coring below 4,100 ft.

Morris County.—Humble Oil & Refining 1 H. N. Wright, 1½ miles southwest of Omaha, was drilling below 7,215 ft. with the Smackover lime its objective. New Paluxy sand test for the district is Rogers Lacy 1 P. A. Paul, 731 ft. from south, 467 ft. from east, 45-acre tract, or 31 ft. from south, 1,300 ft. from west of James Cheshire Survey, southwest of Fruitvale.

Leon County.—The Woodbine sand will be the objective of Iseman & Gieski 1 D. H. Merrill, 1,200 ft. from southwest line and midway between northwest and southeast lines of tract and survey, ½ mile southwest of Buffalo. The pay is expected at about 2,500 ft.

Camp County.—H. S: Moss 1-B Venters unit, Pittsburgh field, had reached 4,950 ft. after entering the Georgetown lime at 4,540 ft. It is a Travis Peak test on the east side of the pool.

EAST TEXAS COMPLETIONS

Wildcats

Panola County: Union Prod. 1 Black, 660 ft. S and E from SW cor. McDonald Sur., but in C. C. Black Sur., elev. 241 ft., flow 16 bbl. distillate and 89,000,000 cu. ft. gas, pay 5,695-5,715 ft., perf. 120 shots, P.B. to 5,720 ft. from 6,596 ft. Discovery.

Cayuga, Anderson County: Tide Water and Seaboard 5-A L. E. Harton, 467 ft. from N and W 82.45-ac. tract, 1,513 ft. N

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of No. 4, S. Edmondson Sur., elev. 302 ft., I.P. 62 bbl., perf. 18 shots 4,017-20 ft., T.D. 4,072 ft.

Hawkins, Wood County: Humble Oil & Ref. 1-C Republic Life Ins. Co., 330 ft. from N'ly W, 511 ft. from E'ly N, 40-ac. unit. H. E. Watson Sur., flow 430 bbl., T.D. 4,660 ft.

Humble Oil & Ref. 10-D B. F. Allen est., George Brewer Sur., dry, T.D. 4,825 ft.

Kildare, Cass County: Rogers Lacy 1 W. M. Davis, 526 ft. from N and S, 660 ft. from E and W, 40-ac. lease, Gideon Sur., elev. 230 ft., flow 628 bbl., 41.7° gravity, pay 6,004 ft., T.D. 6,043 ft.

Quitman, Wood County: Amerada and Gulf 2 S. J. White, 660 ft. from W, 1,780 ft. from S, 255.31-ac. tract, S. G. Purse Sur., flow 681 bbl., perf. 160/6,292-6,345 ft., T.D. 6,350 ft.

OKLAHOMA

Washita County Test May Open New Pool in Granite

OUTCOME of Gulf Oil Corp.'s Washita County wildcat remained uncertain at the end of the week. The well, 1 Hopkins, in NW SE 8-8n-20w, in the southwestern part of the county, had good showings of oil in granite wash at 5,562 ft. Nine-inch casing was set at 5,440 ft., the plug drilled out and the hole washed with fresh water. After setting 8 hours, oil bubbled to the surface and operators filled the hole with heavy mud to stop the flow of oil until tubing is run for a production test.

Location of the well is on the north flank of the Wichita-Amarillo high and a good well here would be an important link in the trend extending from Apache and Cement into the Panhandle area.

Noble County. — Davon Oil Co. 1 Donahoe, SE SW 13-22n-1e, was a Layton sand discovery 2¼ miles east of the Otoe City pool. The well pumped 80 bbl. of oil a day in the sand at 3,204-29 ft. The Otoe City pool also produces in the Layton.

OKLAHOMA COMPLETIONS

Wildcats

Cotton Valley: Stanolind 1 Jones, SE NE 11-3s-10w, dry, T.D. 4,387 ft., Circo 2,585 ft., Canyon 3,485 ft., Arbuckle 4,333 ft.

Garfield County: Watchorn Oil & Gas 1 Kaiser, NE NW 8-20n-3w, dry, T.D. 6,258 ft., Viola 5,950 ft., dolomite 6,010 ft., Wilcox 6,090 ft., second Wilcox 6,228 ft.

Garvin County: Ohio Oil Co. 1 Simpson Kelly, NW NE SW 14-1n-1w, dry, T.D. 4,993 ft., gas in sand at 1,337-48 ft. with 525 lb. pressure.

Hughes County: Burke-Greis and Deep Rock 1 Turner, SW NW 8-7n-10e, 1,500,000 cu. ft. gas and spray of oil, Cromwell sand 3,552-60 ft., T.D. 4,744 ft., Hunton 4,460 ft., Wilcox 4,682 ft.

Marshall County: J. W. Baldwin 1 Taylor, SE SE NE 7-5s-5e, dry, T.D. 4,496 ft., Hunton 2,690 ft., Viola 2,730 ft., Bromide 3,338 ft., Tulip Creek 3,715 ft.

Sinclair Prairie 1 Taylor, SW NW 8-5s-5e, dry, T.D. 665 ft.

Noble County: Davon Oil Co. 1 Donahoe, SE SW 13-22n-1e, pumped 80 bbl., Layton 3,204-29 ft. Discovery.

Pottawatomie County: Stanolind 1 Perkins, SW SW SW 10-8n-3e, flowed 341 bbl., 33-gravity, Hunton 4,854-70 ft., T.D. 5,481 ft.

Stephens County: Fidelity Royalty Co. No. 1, NW NE NW 13-2n-5w, dry, T.D. 3,006 ft.

Fields

Cumberland, Marshall County: Pure Oil 1 Little-117, SE SE NE 20-5s-7e, flowed 175 bbl. in 4 hr., sand 5,942-6,030 ft.

Pure 2 State-111, SE SE SW 20-5s-7e, flowed 223 bbl. in 4 hr., sand 5,952-6,050 ft.

Cushing, Creek County: Central Commercial 1 Combs, NE SW SE 16-17n-9e, pumped 40 bbl., sand 2,496-2,510 ft.

Dilworth, Kay County: Dunn et al 1 Warren, NE NW NW 30-28n-1e, dry, T.D. 3,567 ft., Arbuckle 3,492 ft.

Dave Morgan 3 Klink, NW SE NW 21-29n-1e, pumped 42 bbl., Mississippian chat 3,380-3,467 ft.

Elgin, Comanche County: Texas Co. 1 School Land-D, NW NE NE 16-3n-10w, flowed 15 bbl. oil and 5,000,000 cu. ft. gas, T.D. 1,396 ft., 1 mi. SE extension.

Seminole, Seminole County: Sinclair Prairie 4 Spencer, NE SE 13-9n-6e, pumped 31 bbl., Hunton 4,065-70 ft., T.D. 4,090 ft.

Velma, Stephens County: Skelly 21 McClanahan, NE NE SW 35-1s-5w, pumped 20 bbl., T.D. 894 ft.

E. Watchorn, Pawnee County: Champlin Ref. No. 1, SE SE NE 23-23n-3e, flowed 90 bbl. oil and 75 bbl. water, dolomite 3,861-71 ft.

Miscellaneous

Creek County: Gulf Oil 20 Barnes, W½ NE SW 8-17n-12e, pumped 3½ bbl., T.D. 1,675 ft.

Kay County: F. C. Miller 1 Smith, NE SW 9-26n-3e, dry, T.D. 644 ft.

Okfuskee County: Adelson et al 1 Public Service, SE NW 22-10n-11e, pumped 5 bbl., sand 2,344-52 ft.

Osage County: Sinclair Prairie No. 1, SW NW NE 19-23n-12e, pumped 5 bbl., T.D. 1,772 ft.

Oklahoma Natural Gas No. 2145, N½ NE NW 28-20n-12e, input well for gas storage, Burgess sand 1,601-25 ft., T.D. 1,626 ft.

Pawnee County: Sinclair Prairie 45 Jones, NE SW 20-21n-8e, pumped 3 bbl., T.D. 4,330 ft.

LOUISIANA GULF

Wilcox Test in Reddell Area Being Deepened

NEW ORLEANS, La.—After reaching the contract depth of 10,500 ft. it was decided to carry Danciger Oil & Refining Co. 1 Hattie Haas, in the Reddell area of Evangeline Parish. 250 ft. deeper, and at latest report operators were coring below 10,700 ft. The Hattie Haas test is reported to have encountered oil shows in sand stringers in the Wilcox, which was topped at about 10,525 ft. It is said also to have logged saturation in gas and distillate sand at about 9,800 ft.

J. S. Abercrombie et al 1 Alexander Charles Unit 2, 2 miles southwest of Leonville in St. Landry Parish, where minor shows had encouraged hope of finding a producer, was completed dry at 10,220 ft.

Terrebonne Parish. — Another 12,000-ft. test in the Deer Island area is planned by Humble Oil & Refining Co., which obtained a permit to drill 4 Continental Land & Fur Co., in 13-18s-12e. Union Oil Co. of California was drilling ahead from 8,640 ft. at 1 Calvert & Todd, 1 mile north of Houma. An electric survey, run from 8,640 ft., is said to have indicated no oil shows.

Beauregard Parish.—Sohio Producing Co. 1 Lutcher-Moore Lumber Co., 1¾ miles west of Fields, set 10¾-in. casing at 2,011 ft. and was waiting for the cement to set. American Republics Corp. 2-X Lutcher-Moore Lumber Co., Cockfield sand test a mile northwest of Bancroft, was drilling in shale at 7,120 ft.

Acadia Parish.—Continental Oil Co. 1 Acadia Parish School Board, a mile Armide Gornay, in 2-4s-1w, Pine Prairie survey to total depth of 9,237 ft. and cemented 7-in. casing at that level. At the week's close it was waiting for cement to set. Union Sulphur Co. was preparing to spud 1-A Andrus, 50-8s-12e, second test in the Branch area, recently opened to production by the same company's 1 J. P. Gueno.

Cameron Parish.—Continental et al 1 Adolph Hebert, Jr., in the Big Lake area, was drilling at 8,943 ft. in streaky shale. Magnolia Petroleum Co. has staked location for 1 R. A. Moore, 3 miles east of the Black Bayou field.

Rapides Parish.—Moran Oil Co. was moving in material for 1 Meeker, wildcat test in the North Lake Cocodrie area. The hole is projected to go to 7,500 ft.

Evangeline Parish.—Gulf Refining Co. has received permit to drill 1 Armide Gornay, in 2-4s-1w, Pine Prairie field.

LOUISIANA GULF COAST COMPLETIONS

Wildcats

St. Landry Parish: J. S. Abercrombie et al 1 Alesander Charles Unit 2, 23-7s-5e, dry at 10,220 ft.

Fields

Anse la Butte, St. Martin Parish: Stanolind 1-B J. J. Martin et al, 122-9s-5e, O.W.W.O., old T.D. 6,488 ft., new P.B. T.D. 6,352 ft., 110½ bbl. oil and 19½ bbl. salt water through ⅛-in. choke, T.P. 100 lb., perf. 6,340-47 ft.

Napoleonville, Assumption Parish: George H. Echols 1 Kessler & Sternfels, 136-12s-14e, O.W.W.O., old T.D. 10,474 ft., new P.B. T.D. 9,043 ft., 146 bbl. through ⅛-in. choke, T.P. 425 lb., gas-oil ratio 415, perf. 9,032-42½ ft.

North Crowley, Acadia Parish: Humble 5 J. B. Stokes, 33-8s-13, O.W.W.O., old T.D. 8,955 ft., new P.B. T.D. 7,975 ft., 208.8 bbl. through ⅛-in. choke, T.P. 1,450 lb., gas-oil ratio 817 ft., perf. 7,960-70 ft.

Humble 3 J. B. Stokes, 33-8s-1e, O.W.W.O., old T.D. 8,860 ft., new P.B. T.D. 7,135 ft., 312 bbl. through 5/32-in. choke, T.P. 1,325 lb., gas-oil ratio 585, perf. 7,125-32 ft.

Pine Prairie, Evangeline Parish: E. J. Nickols et al Jessie Reed, 36-3s-1w, location abandoned.

Michigan Fields

(Continued from Page 76)

Van Buren County, Bangor Township: Socony-Vacuum Oil Co., Inc., 1 Brand, et al, communitized, SW NW NW 9-2s-16w, dry, T.D. 1,022½ ft.

Fisher-McCall Oil & Gas, Inc., 1 Donova SE SW SW Sec. 25, wildcat, dry, T.D. 1,020 ft.

Geneva Township: Socony-Vacuum 1 Varnum, NE SW SW 24-1s-16w, dry, T.D. 1,077½ ft.

Louis Rose 1 William and Rose Abbott, NE NW NE Sec. 26, dry, T.D. 1,300 ft.

ROCKY MOUNTAIN

Elk Basin Tensleep Pay Covers Large Area

DENVER, Colo. — An important extension of the Tensleep sand pool in Elk Basin forecast last week when Yale Oil Corp. 1 Watson, NE NE SE 36-58n-100w, on the southwest flank, encountered saturation in the Embar, was fulfilled this week when the hole was drilled into the objective with good results. It topped saturation in the Tensleep at 5,409 ft. and was drilled to 5,420 ft. and stopped for a drill-stem test. The tester was open for 30 minutes and from the 10 ft. of upper sand oil rose 5,000 ft. The well is located 1¼ miles southwest of the discovery, and far out beyond the limits of the pool in the Frontier. The Tensleep was encountered approximately 1,300 ft. lower on structure than in the discovery well and 1,750 ft. below the crest of the anticline 2 miles to the northwest of the discovery. The recent estimate of the U. S. Geological Survey that approximately 4,000 acres on the structure will be productive in the Tensleep now appears to be confirmed by the new development. Estimates on the probable reserves vary to a large extent, ranging from 10,000 bbl. per acre, made by the Geological Survey before the Watson well came in, up to 50,000 bbl. an acre following the extension. R. S. Shannon, president of the Minnelusa Oil Corp., to whom credit is given for the bringing in of the new field, declined to give any figures, but said he believed the estimate of 10,000 bbl. was too low and that the later estimate is rather high.

Gas well at Douglas Creek. — The deep test of the Superior Oil Co., of California, on the Douglas Creek structure in Rio Blanco County, Colorado, a joint operation with the Continental Oil Co., and the Union Oil Co. of California, in 1 Government, NW NW SW 5-3s-101w, will be completed as a gas discovery. It was drilled to 8,554 ft. and then began plugging back and testing upper horizons. The Sundance section at 5,069-5,740 ft. and the Morrison at 4,800-20 ft. failed to show anything of importance. It was then plugged back to 4,650 ft. and casing was perforated in the Dakota at 4,326-36 ft. With the tester open 2½ hours it flowed at the rate of 4,870,000 cu. ft. of gas per day. A squeeze job then was run and casing was perforated at 4,350-4,400 ft., and with tester open 20 minutes it flowed at the rate of 5,500,000 cu. ft. a day. It will be completed as a gas well and will be shut in as at present there is no market for the gas. The Superior company, on its own account, has been engaged in unitizing the South Douglas Creek structure, immediately to the south, and probably will drill another test.

Cut Bank Sunburst pool extended. Glacier Production Co. 2 McGuinness unit in 5-35n-5w, on the west side of the Cut Bank field in the northern area, which came in flowing 240 bbl. in 24 hours from the upper Sunburst sand 3 weeks ago when the rig burned down after coring 12 ft. into the sand, cored 22 additional feet of saturated Sunburst and was completed as a flowing well, making 840 bbl. first 24 hours. It is a little more than ¼ mile south of 1 McGuinness unit, which was drilled last fall as a probable extension of the gas area and came in as an oil well in the Sunburst and averaging 700 bbl. daily on a 10-day test. The oil is 47 gravity. At the time of completion it was 2½ miles west of the nearest oil well, and ½ mile from the nearest gas well. Same company's 3 McGuinness unit, two locations north of the discovery, is spudding.

North McCallum extended.—Continental Oil Co. 5 Pollock, C NE SW 2-9n-79w, North McCallum field, Jackson County, Colorado, approximately 1 mile northwest of the discovery, which was completed in 1927 for 450 bbl. of oil and 30,000,000 cu. ft. of carbon dioxide gas, is a near completion and will make a producer. It was drilled to 5,129 ft. and 7-in. was set at 5,124 ft. The casing was perforated at 5,038-75 ft. with 75 holes and it flowed an average of 216 bbl. a day of 46-gravity oil with 11,200,000 cu. ft. of gas. Tubing is being pulled to run a squeeze job, after which casing will be perforated for a test at 5,049-80 ft. The oil is in the Frontier, the same zone in which it was found in the discovery.

WYOMING COMPLETIONS

Lance Creek, Niobrara County: Continental Oil Co. 5 Rodeo-2, SE SW SW 26-36n-65w, T.D. 5,363 ft., 7-in. 5,300 ft., swabbed 180 bbl. from Leo, acid, installing pump.

Salt Creek, Natrona County: Stanolind Oil & Gas Co. 8-T Unit, NW SW 26-40n-79w, T.D. 4,085 ft., 5½-in. 4,068 ft., 248 bbl. from Tensleep at 3,972-4,085 ft.

MONTANA COMPLETIONS

Aloe district, Toole County: Northern Ordnance, Inc. 1 A. J. Moser, SW NW 14-33n-3w, T.D. 1,824 ft., Sunburst dry at 1,435-60 ft., show of oil at 1,690-1,712 ft., top of Madison 1,717 ft., dry.

Bowdoin, Philips County: Montana-Dakota Utilities Co. 604 Smith, SE SE 23-33n-32e, T.D. 1,196 ft., Bowdoin sand 1,050-70 ft., Phillips sand 1,125-40 ft., 84,910 cu. ft., 418 lb. pressure.

Montana-Dakota Utilities No. 607, SW SW 21-33n-32e, T.D. 1,080 ft., Bowdoin sand 862-90 ft., Phillips sand 1,050-65 ft., 13,000 cu. ft., 320 lb. pressure.

Cedar Creek, Fallon County: Montana-Dakota Utilities Co. No. 185, NE NE 22-8n-59e, T.D. 895 ft., sand in Judith River at 785-895 ft., 5½-in. 781 ft., 1,780,000 cu. ft., 98 lb. pressure.

Cut Bank, Glacier County: Santa Rita Oil & Gas Co. 7 Jordan, SW NE 18-32-5w, T.D. 2,825 ft., 7-in. 2,784 ft., Cut Bank sand 2,780-2,835 ft., main pay 2,810-25 ft., 1,800 ft. oil in hole, swabbed 140 bbl.

Glacier Production Co. 3 Thayer, SE NE 28-33n-5w, T.D. 2,970 ft., P.B. to 2,964 ft., 7-in. 2,901 ft., Cut Bank 2,890-2,964 ft., main pay 2,950-64 ft., swabbed 46 bbl., shot, slight increase.

Glacier Production Co. 2 McGuinness unit, SE SW SW 5-35n-5w, T.D. 2,869 ft., 7-in. 2,833 ft., upper Sunburst 2,827-65 ft., cored sat. sandstone at 2,833-65 ft., gray sandy shale 2,865-69 ft., flowed 840 bbl.

Red Creek district, Toole County: Northern Ordnance, Inc., 1 State, NE NE 10-36n-4w, T.D. 2,880 ft., top Madison 2,779 ft., dry.

Illinois Fields

(Continued from Page 75)

Berger, NW NW SE 25-4n-9e, pumped 8 bbl., Cypress sand 2,549-63 ft., T.D. 2,370 ft.

North Sims, Wayne County: Pure 1 L. A. Manahan, NE SW NE 17-1s-6e, pumped 44 bbl., Aux Vases sand 3,001-36 ft., T.D. 3,055 ft.

South Lawrence, Lawrence County: C. F. Ross 1 E. Blair, SW NW SW 25-2n-12w, dry at 1,445 ft.

W. E. Bailor 1 William Rentschler, SE NE NE 27-2n-12w, pumped 38 bbl., Biehl sand 1,366-92 ft., shot, T.D. 1,395 ft.

Central Pipe Line 2 C. Havermale, SW SW NE 23-2n-12w, pumped 39 bbl., Benoist sand 1,894-1,901 ft., shot, T.D. 1,911 ft.

South Maunee, White County: Sinclair-Wyoming 1 Frank Ackerman, SE SW SW 13-6s-10e, pumped 15 bbl. oil, 15 bbl. water, Cypress sand 2,570-77 ft. and 2,583-94 ft., shot, T.D. 3,007 ft.

South Sailor Springs, Clay County: McBride, Inc., 1 A. O. Clark, SE NE NE 3-3n-7e, dry at 2,997 ft.

Salem, Marion County: Texas 2 F. Frick, SW SE NE 16-1s-2e, pumped 24 bbl. oil, 35 bbl. water, Benoist sand 1,906-10 ft., shot, T.D. 1,919 ft.

West Inman, Gallatin County: R. B. Martin 3 Straub, NE NW SW 15-8s-9e pumped 55 bbl. oil, 2 bbl. water, Cypress sand 2,490-2,506 ft., Weiler sand 2,517-40 ft., T.D.

R. B. Martin 3 Bahl, SW SE NW 15-8s-9e, pumped 7 bbl., Tar Springs sand 2,188-94 ft., Cypress sand 2,498-2,505 ft., both shot, T.D. 2,545 ft.

Permian Basin, Panhandle

(Continued from Page 72)

111 bbl., dolomite, lime and sand pay 3,139 ft., T.D. 3,250 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—Eight miles north of Magnolia Petroleum Co. 20 State-Walton, Ellenburger discovery in Winkler County, Texas, Humble Oil & Refining Co. will drill 1 Leonard-Federal, SW SW 12-26s-37e, a 9,500-ft. Ellenburger project in the Rhodes area of southwest Lea County. The new test is 6 miles south of Olsen Oil Co. and Atlantic Refining Co. 1 Langlie, an Ellenburger failure which has been plugged back to complete from the Permian pay at 4,990 ft.

SOUTHEAST NEW MEXICO COMPLETIONS

Fields

Jackson-Grayburg, Eddy County: B. Cockburn 9 State, NE SE 36-16s-30e, flow 100 bbl., pay 3,050-60 ft., T.D. 3,100 ft.

Superior Oil Corp. 3 Foster, SE NW 17-17s-31e, flow 80 bbl., lime pay 3,354 ft., shot 440 qt., T.D. 3,520 ft.

Maljamar, Lea County: George Turner 1 L. R. Simon, SE SE 31-17s-32e, elev. 3,869 ft., dry, T.D. 4,527 ft.

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N. CENTRAL TEXAS

Oil Found in Marble Falls Lime in Young County Test

WICHITA FALLS, Tex.—Anderson-Prichard Oil Corp. and Col-Tex Refining Co. 1 W. T. Donnell, 990 ft. from north, 4,101 ft. from west of 1,046-acre tract in Margaret Edmonds Survey, 2 miles southeast of Murray, southwest Young County, last week indicated production from Marble Falls lime topped at 4,184 ft., with saturation to 4,200 ft., showing 1,300 ft. of 40-gravity oil on drill-stem test in 45 minutes, with no water reported. The test is to be carried to the Mississippi lime before casing is run and a test of the Marble Falls made if the Mississippi is dry.

In the Murray field, Standard Oil Co. of Texas and Hanlon-Buchanan, Inc., 4 Sallie R. Donnell, a failure in the Mississippi at 4,606 ft., indicated a new pay zone for the pool when it was plugged back and perforated opposite the Caddo lime at 3,745-50 ft. and the hole filled 1,500 ft. with oil in 8 hours. The pay zone will probably be acidized. The same operators were drilling ahead on 1 R. T. Wells, a wildcat 3 miles south of Proffitt, in Section 738, T.E.&L. Survey, after topping the Mississippi lime at 4,662 ft. The test had logged a show of oil in Caddo lime at about 3,870 ft. A new wildcat test for the county is W. E. Production Co. 1 R. E. Caswell, 467 ft. from north and east of west 120 acres of north 240 acres of Section 624, T.E.&L. Survey, 10 miles southeast of Olney. The wildcat is projected to Ellenburger at about 5,500 ft.

Baylor County.—Continental Oil Co. and British American Oil Producing Co. 1 E. W. Hunt, a wildcat slated to test the Ellenburger horizon, topped lower Caddo lime at 5,496 ft. and was drilling ahead below that depth with no shows reported. Elevation of the test is 1,380 ft.

Archer County.—Another wildcat to test the Ellenburger is L. T. Burns 1 J. B. Frerich, 1,500 ft. from south, 1,000 ft. from west, Lot 106, Block 4, Clark & Plumb subdivision, 3 miles northwest of Windthorst, contracted to 6,000 ft.

Wichita County.—Continental Oil Co. 1 G. T. West, 1½ miles west of Wichita Falls, topped Caddo lime at 5,233 ft., with oil showing at 5,240-50 ft. and drill-stem test from 5,264-74 ft. showed only mud, and drilling was resumed. Consolidated Oil Co. 1 A. Laukhuff, 2 miles south of Wichita Falls, topped Ellenburger at 5,327 ft. without shows, and drilling was continuing.

NORTH TEXAS COMPLETIONS

Wildcats

Archer County: Dillard & Wood 1 Albright, 330 ft. from S and E, NW SE Blk. 4, Hooper & Wade Sur., K.M.A. sand 3,994 ft., dry, T.D. 4,955 ft.

Cooke County: W. T. Lucas 1 Mrs. L. C. Gilliland, 330 ft. from N and E, 143-ac. tract, Thomas Toby Sur., elev. 1,020 ft., dry, T.D. 1,814 ft.

Young County: Anderson-Prichard and Darby 1 J. C. McCorn, 1,279 ft. from S, 777 ft. from E, Toby Hewitt Sur., Caddo lime 3,522 ft., S.O. 3,522-25 ft., dry, T.D. 4,013 ft.

Mudge Oil 1 J. M. Davidson, 467 ft. from S and E, Sec. 272, T.E.&L. Sur., Caddo 3,894 ft., Marble Falls 4,488 ft., Barnett 3,790 ft., Mississippi 4,876 ft., dry, T.D. 4,876 ft.

T. F. Hunter 1 G. H. Roach, Sec. 304, T.E.&L. Sur., dry, T.D. 1,293 ft.

Fields

Archer County: Louis Sikes 1 J. H. Turbeville, 1,095 ft. from N, 225 ft. from E, NW 40 ac. of Blk. 34, J. W. Harris subd., dry, T.D. 1,460 ft.

Bowers, Montague County: Rogers Bros. Drlg. Co. 3 E. D. Glass, 1,263 ft. from S, 467 ft. from E, N 106.6 ac. of J. Woodruff Sur., dry, T.D. 3,147 ft.

Cooper, Archer County: Champlin Ref. 1 Katie Demgen est., 603 ft. from N, 330 ft. from W, Blk. 18, Denton County School Land, Lge. 3, flow 161 bbl., pay lime 4,939 ft., acid 5,000 gal., T.D. 4,976 ft.

G. W. Cooper 1-A J. J. Perkins, 660 ft. from N and W, Blk. 30, Denton County School Land, K.M.A. sand 4,056 ft., Caddo 4,646 ft., dry, T.D. 5,097 ft.

Hoefle, Jack County: Standard Oil Co. of Texas and Hanlon-Buchanan 2 J. Moore, 467 ft. from N, 4,200 ft. from W, J. B. Jackson Sur., dry, T.D. 4,960 ft.

Howsley-McCord, Throckmorton County: Owenwood Pool 3 2-B Howsley-McCord, W½ E½ Sec. 8, Comanche Indian Reserve, dry, T.D. 760 ft.

Scotland, Archer County: R. H. Hawn 3 A. B. Edwards, Blk. 33, Lula P. Hunt subd., Madison County School Land, flow 256 bbl., lime pay 5,215 ft., acid 3,000 gal., T.D. 5,235 ft.

Vogtsberger, Archer County: Jennings Drilling Co. 1 Robert Vogtsberger, 477 ft. from E, 467 ft. from S, N 44.13 ac. of E 84.13 ac., Blk. 2, German Emigration Sur., flow 240 bbl., lime pay 4,755 ft., T.D. 4,794 ft.

Wichita County: Ernest Prod. 2-A F. P. Warren, 330 ft. from N and E, 122-ac. tract, W. J. Smith Sur., dry, T.D. 1,455 ft.

Workover Wells

Knox, Young County: C. E. Knox 5-A Mrs. E. Taylor, 1,800 ft. from N, 1,500 ft. from E, Sec. 3407, T.E.&L. Sur., Caddo 3,902 ft., Mississippi 4,800 ft., S.O. 4,800-18 ft., old T.D. 4,407 ft., new T.D. 4,818 ft., pump 12 bbl., pay 4,135-42 ft., P.B. to 4,200 ft.

Knight, Young County: Dean Bros. et al 2 B. W. King, 1,535 ft. from S, 660 ft. from W, C. N. Russell Sur., dry, old T.D. 3,795 ft., new T.D. 4,309 ft.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Coleman County: James C. Ellis et al 1 W. D. Ray, 502 ft. from S, 921 ft. from W of 42-ac. tract, Sec. 687, J. P. McLean Sur., pump 19 bbl., pay 2,138-ft. sand, T.D. 3,150 ft. Discovery, Rock Crusher pool.

Taylor County: Butler & Horne Drlg. Co. 1 W. C. Moore, 7,450 ft. from S, 330 ft. from W, D. T. Bruce Sur., dry, T.D. 2,240 ft.

Fields

Bluff Creek, Shackelford County: Daniels & Pardue 1-B G. R. Davis, 330 ft. from N and W of lease in Sec. 219, E.T.R.R. Sur., pump 15 bbl., pay sand 1,603 ft., T.D. 1,614 ft.

Brown County: Gilcrease Oil 1 Transwestern, Sec. 41, H.T.&B. Sur., dry, T.D. 1,550 ft.

Comanche County: J. W. McClung 1 W. T. Lindley, 200-ac. tract, Singleton-Thompson Sur., dry, T.D. 615 ft.

Hatchett, Callahan County: L. A. Warren et al 1 P. G. Hatchett, 90 ft. from N, 220 ft. from E, Sec. 24, D.&D.A. Sur., T.D. 836 ft.

NORTH LOUISIANA

Third Deepening Results in New Pettit Lime Discovery

SHREVEPORT, La.—Another Pettit discovery in north Bossier Parish, 4 miles west of the Carterville discovery, brightened the picture for operators in the North Louisiana-Arkansas area. The well, Edgar C. Johnson 1 Blocker, NE NW SW 1-22n-13w, was reported to be swabbing as high as 150 bbl. of near 40-gravity oil in the lime at 6,430-52 ft. Location of the well is 1½ miles east of the town of Plain Dealing and ½ mile east of the Plain Dealing-Redland road.

NORTH LOUISIANA COMPLETIONS

Wildcats

De Soto Parish: Grand Cane Oil & Gas 1 O'Neal, SE NW 24-12n-15w, dry, T.D. 5,425 ft.

A. W. Phillips 1 Pollock, SE NE 8-13n-12w, dry, T.D. 3,008 ft.

Morehouse Parish: Sohio Producing Co. 1 Carter, NE SE 34-19n-6e, dry, T.D. 6,008 ft.

Red River Parish: Peterson Pet. Co. 1 Wilkinson, SE SE 11-12n-10w, 360,000 cu. ft. gas, Nacatoch 1,055-60 ft., T.D. 5,196 ft.

Fields

Caddo, Caddo Parish: Conway Oil Co. 2 Muslow, SE NW NW 4-20n-15w, pumped 15 bbl., chalk 1,390-1,528 ft., T.D.

Calvin, Winn Parish: H. L. Hunt F-27 Goodpine, NE SW 14-12n-5w, dry, T.D. 7,047 ft.

De Soto Parish: Grand Cane Oil & Gas 1 Union Central, SW NW 22-13n-14w, dry, T.D. 3,916 ft.

Joaquin, De Soto Parish: Southern Prod. Co. 1 Hollingsworth, approx. C 32-12n-15w, 130,000,000 cu. ft. gas, Glen Rose 4,916-26 ft., T.D. 5,026 ft.

ARKANSAS COMPLETIONS

Wildcat, Columbia County: Hunt Oil Co. 1 Bodcaw, NE NE 9-20s-21w, dry, T.D. 6,337 ft.

Atlanta, Columbia County: C. B. Ragsdale 1 Longino-Talley, SE SW SW 11-18s-19w, flowed 160 bbl., Smackover 8,174-84 ft., T.D. 8,185 ft.

Eldorado, E, Union County: B. S. J. Corp. 1-A Jerry, E½ SW SW 21-17s-14w, pumped 10 bbl., Red Beds 2,710-13 ft., T.D. 2,734 ft.

Johnson County: Arkansas Louisiana Gas Co. 1 Hendrick, NW NW SE 21-10n-21w, 2,582,000 cu. ft. gas, Atoka 2,860-95 ft., T.D. 3,255 ft.

Midway, Lafayette County: Barnsdall 1 Darnell, NW NE 9-15s-24w, flowed 178 bbl., Smackover 6,468-82 ft., T.D.

Stephens, Columbia County: Lechner & Hill 1 W. L. Smart, NE NW 14-15s-20w, pumped 185 bbl., Tokio sand 2,532-46 ft., T.D. 3,478 ft.

MISSISSIPPI

JACKSON, Miss.—Reports that oil showings had been encountered in side-wall cores at California Co. 1 Natural Gasoline Co. of Louisiana, Inc., in the Sandy Creek plantation, 16 miles east of Natchez, Adams County, turned lively interest toward that wildcat. Leasing in that area is said

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to have become more active as a result of the well's increasingly favorable prospects. A pumping unit was installed at California Co. 1 G. T. Smith, 4-7n-7e, Lincoln County, but bottom-hole pressure prevented the unit from working, and the well was shut down. In a recent test the G. T. Smith flowed at the rate of 25 bbl. daily through 2½-in. tubing.

MISSISSIPPI COMPLETIONS

Wildcats

Jefferson County: Gulf 1 Sarah B. Cupit et al, 19-8n-4e, dry at 2,070 ft.

Marion County: Gulf 1 E. H. Bradshaw, 20-3n-17w, dry at 1,627 ft. in sidetracked hole.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, District Land Office, Las Cruces, New Mexico. Notice is hereby given that the S½ NW¼ sec. 9, T. 22 S., R. 37 E., N.M.P.M., New Mexico, 80 acres of land in the Penrose-Hardy oil and gas field, is offered as one parcel to the responsible qualified bidder of the highest bonus per acre for lease under section 17 of the act of February 25, 1920 (41 Stat. 437), as amended, at the royalty rate scale in the lease form in General Land Office Circular 1386, at a sale to be held in the district land office at Las Cruces, New Mexico, at 10 o'clock a.m. on July 28, 1943. The successful bidder must deposit on the date of the sale a certified check on a solvent bank, or cash, for one-fifth of the amount of his bid, and file a showing of qualifications to receive the lease as required by section 7 of Circular 1386. The remaining four-fifths, together with the annual rental in advance at the rate of $1 per acre, must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. The bidders are warned against violation of the provisions of section 59 of the United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior.

Register.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Billings, Montana. Notice is hereby given that the lands herein described within the known geologic structure of the Elk Basin field, Montana and Wyoming, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. 226), at a sale to be held in the district land office at Billings, Montana, at 10 o'clock a.m. August 12, 1943, in the following parcels: Montana, M.M., Parcel No. 1, T. 9 S., R. 23 E., sec. 34, lot 8, sec. 36, lot 5. Wyoming, 6th P.M., Parcel No. 2, T. 58 N., R. 99 W., sec. 19, N½NW¼NW¼SE¼, E½NW¼SE¼, E½SW¼SE¼; Parcel No. 3, T. 58 N., R. 99 W., sec. 30, E½NE¼NW¼NE¼, NE¼SE¼NW¼NE¼, NW¼NE¼NE¼, W½SW¼NE¼NE¼, NE¼SW¼NE¼NE¼, E½E½NE¼, SE¼NW¼SE¼NE¼, SW¼SE¼NE¼, NW¼NE¼SE¼, E½E½SE¼, SW¼SE¼SE¼; Parcel No. 4, T. 58 N., R. 100 W., sec. 23, lot 1, SE¼NE¼; Parcel No. 5, T. 58 N., R. 100 W., sec. 25, NE¼NW¼, W½SW¼NE¼SE¼, W½SE¼SE¼, S½NE¼SE¼SE¼, SE¼SE¼SE¼; Parcel No. 6, T. 58 N., R. 100 W., sec. 36, E½NE¼. Each successful bidder must deposit on the date of sale with the officer in charge of the sale a certified check on a solvent bank or cash for one-fifth of the amount bid by him and file the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Bids may be submitted combining two or more parcels for the lands in Wyoming provided the aggregate acreage does not exceed 640 acres, the drilling, producing, rental and royalty requirements to apply separately to each parcel. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior.

Register.

OHIO, KENTUCKY

Lakeville Gas Field Extended to Northeast

ZANESVILLE, Ohio.—The Lakeville gas pool in Washington Township, Holmes County, was extended ½ mile northeast by the Ohio Fuel Gas Co. 1 S. P. Kopp in Section 26. The well gaged 4,160,000 cu. ft. with rock pressure of 1,070 lb.

Glenn Harmon found a small producer, extending the Wellington pool in Lorain County, Penfield Township. Two wildcats are being drilled in Coshocton County by the Ohio Fuel, one on the Landis tract in Section 5, Jackson Township, and the other on the Zimmer tract in Lot 8, Lafayette Township.

OHIO COMPLETIONS

Athens County, Carthage Township: Ohio Fuel 2 A. W. Greiner, Sec. 33, Mxbg. 800 ft., dry, T.D. 1,053 ft.

Coshocton County, Pike Township: Kundtz & Hulse 1 Harold Criss, Sec. 15, Clinton, dry, T.D. 3,230 ft.

Fairfield County, Pleasant Township: City Nat. Gas 3 A. M. Grier, Sec. 35, Clinton, dry, T.D. 2,420 ft.

Holmes County, Washington Township: Ohio Fuel 1 S. P. Kopp, Sec. 26, Clinton, 4,160,000 cu. ft., T.D. 2,917 ft.

Lorain County, Penfield Township: Glenn Harmon 1 J. L. Jones, Lot 4, Clinton, 535,000 cu. ft., T.D. 2,464 ft.

Meigs County, Salem Township: Downie et al 1 Isaac Dyke, Sec. 13, Keener, dry, T.D. 796 ft.

Morgan County, York Township: Rees et al 1 S. F. Pletcher, Sec. 24, Berea, 78,000 cu. ft., T.D. 1,180 ft.

Noble County, Enoch Township: McGinnis et al 5 A. G. Schoeppner, Sec. 17, Berea dry, T.D. 1,535 ft.

Perry County, Clayton Township: Pure Oil 5 E. F. Smitley, Sec. 8, Clinton, 40 bbl., T.D. 3,295 ft.

Reading Township: Industrial Gas 2 Metta Snider, Sec. 11, Clinton, dry, T.D. 3,110 ft.

Industrial Gas 1 Vincent Meloy, Sec. 21, Clinton, dry, T.D. 2,959 ft.

Stark County, Pike Township: Natural Gas W. Va. 1 Charles Hickman, Sec. 30, Clinton, 50,000 cu. ft., T.D. 4,637 ft.

Washington County, Grandview Township: Henry Wendleken 1 J. W. Carpenter, Sec. 5, Injun, dry, T.D. 1,700 ft.

WESTERN KENTUCKY

OWENSBORO, Ky.—Carter Oil Co. has opened another pool in western Kentucky. Carter's No. 1 DeVasher, 2 miles from production in the Robards pool in Henderson County, made a 2-hour drill-stem test at 2,494-2,506 ft., McClosky lime, and 1,450 ft. of oil, and 90 ft. of oil-cut mud, but no water, was recovered. Carter's 3 Russellburg, 4 miles south of the Smith Mills pool in Henderson County swabbed 170 bbl. of oil in 8 hours from Waltersburg sand at 2,700-13 ft.

WESTERN KENTUCKY COMPLETIONS

Union County: H. H. Weinert 1 Greenwell, a wildcat, 1½ mi. N of Morganfield, pumped 303 bbl., McClosky lime 2,581-93 ft., acid., T.D. 2,675 ft.

Calstar Petroleum 1 Mason, a wildcat, dry at 2,767 ft.

Henderson County: Trans-Tex 1 O. W. Rash heirs, dry at 2,672 ft., Glen Dean 1,970 ft., Golconda 2,134 ft., Barlow 2,235 ft., Cypress 2,322 ft., Ste. Genevieve 2,557 ft., McClosky 2,589-96 ft.

W. F. Lacy 1 M. L. Cooper, a wildcat, dry at 2,683 ft., Menard 1,699 ft., lower Menard 1,775 ft., Vienna 1,852 ft., upper Glen Dean 1,948 ft., lower Glen Dean 1,956 ft., Golconda 2,124 ft., Barlow 2,235 ft., Cypress 2,251 ft., Renault 2,448 ft., Ste. Genevieve 2,532 ft.

Gulf Refining Co. 10 T. T. Williams Smith Mills pool, pumped 292 bbl. oil, 60 bbl. water, Cypress sand 2,304-17 ft., T.D.

Gulf Refining 1 H. H. Morehead, Smith Mills pool, pumped 696 bbl., Cypress sand 2,293-2,316 ft., T.D.

Gulf Refining 2 H. H. Morehead, pumped 562 bbl. oil, 240 bbl. water, Cypress sand 2,295-2,314 ft.

Davies County: Andrew Teller, trustee, 1 R. A. Alvey, a wildcat 1½ mi. SW of Panther, dry at 2,036 ft.

EASTERN KENTUCKY

ASHLAND, Ky. — Drilling operations in eastern Kentucky continued to develop this week but the number of completions slumped to one.

Kentucky-West Virginia Gas Co. reported completion of 5462 Thomas H. Burgy, Johns Creek, Floyd County, at 2,460 ft. The well has an open flow of 70,000 cu. ft. of gas from shale and 97,000 cu. ft. open flow from Big lime.

INDIANA COMPLETIONS

Posey County: Bristol Hackbush 1 H. H. Schweikhand, NW NE SW 23-5s-12w, dry at 1,203 ft.

Spencer County: Dameron & Gary and L. N. Savage 1 L. Martin, SW SE NW 36-7s-7w, pumped 100 bbl., Penn sand 904-16 ft., T.D. 916 ft.

Pike County: J. B. Graham 1 John Adams, a wildcat, C NW NW 15-1n-7w, dry at 1,203 ft., Ste. Genevieve top 1,145 ft.

California Fields

(Continued from Page 67)

3,417 ft., gravel packed perf. 3,011-3,279 ft., 3,324-3,415 ft.

Long Beach Oil Dev. 1-Z-1Z, 2-5s-13w, pumped 222 bbl., 19.4-gravity, 2 per cent cut, T.D. 3,000 ft., gravel packed perf 2,578-2,791 ft., 2,816-98 ft.

COASTAL DISTRICT

In the Aliso Canyon field General Petroleum Corp. has spudded 1 Mendota, 22-3n-16w, and Standard Oil Co. of California is preparing rig site for 1-1 Frew which will be drilled in 29-3n-16w. The latter wildcat is west of Standard's Sesnon property at the west end of the Aliso Canyon field where an excellent flowing well was finished several months ago. Standard's Frew wildcat is searching for an extension of the Aliso Canyon structure or a new high in Section 29.

COASTAL DISTRICT COMPLETIONS

Gato Ridge, Santa Barbara County: Barnsdall 6 Tognazzini, 9-8s-32w, pumped 405 bbl., 13.8-gravity, 0.6 per cent cut, T.D. 3,767 ft., perf. 2,502-3,766 ft.

Santa Maria Valley, Santa Barbara County: Union 7 Vicente, 21-10n-34w, pumped 340 bbl., 16.9-gravity, 3 per cent cut, T.D. 4,885 ft., perf. 4,698-4,885 ft., bottomed in Franciscan basement, completed in Monterey.

CANADIAN FIELDS

Dry-Gas Discovery Reported From Fort Nelson Area

CHATHAM, Ont. — Premier John Hart of British Columbia has announced that dry gas has been discovered in quantity in the Fort Nelson area of northern British Columbia. The area is on the Nelson River, about 250 miles northwest of Fort St. John and close to the Alaska Highway. The gas was discovered by United States engineers in search of water. No details have been given out as to the extent of the discovery, except that the production will be used by the United States forces in that area for fuel and lighting.

Lloydminster.—Systematic development of the oil possibilities of the Lloydminster field in eastern Alberta and western Saskatchewan is being undertaken by R. L. Shaw of Lloydminster Refineries, with the backing of a Winnipeg group. Contract has been signed with C. E. Mills for Sparky 1, LSD 8, 32-49-1w4, which will be drilled to the lime or production. Rotary outfit is being used, and surface casing has been set at 250 ft. Mr. Shaw also holds the controlling interest in the three Shaw wells and Franco Oils 3, which will be reconditioned and placed in production. Shaw 1, a gasser, is being put in shape to supply drilling fuel. In the gas end of the field, mostly on the Saskatchewan side of the boundary, a first gas sand is met around 1,400 ft. and Colony No. 1 gasser produced 38,000,000 cu. ft. daily from a lower sand at 1,700 ft. Oil production is secured from 1,700 to 1,922 ft. The crude is similar to the Vermilion product, but somewhat heavier.

Dutch Creek.—In the southern Alberta foothills, a new potential oil structure will be tested along Dutch Creek, west of the Oldman River and the Livingstone Range. Western Canadian Collieries has secured a reservation of 19,424 acres in Townships 10 and 11, Range 5w5, and will drill for oil. The structure is in a general westerly direction from the nearest drilling test, Royal Sun Petroleum 1, LSD 2, 17-13-3w5, which is drilling in the Banff shales below 2,150 ft.

McMurray. — L. R. Champion and associates of Montreal have acquired the holdings and patents of the International Bitumen Co. on the Athabaska River in northern Alberta, and will reopen the oil sands separation and refinery plant at Bitumont. The company's holdings are about 50 miles down the river from McMurray and the plant, which has a capacity of 322 bbl. a day, is equipped to produce diesel and road oil, asphalt and roofing products from the bitumen. A new company, Oil Sands, Ltd., is being organized to handle the operations.

TURNER VALLEY COMPLETIONS

North Turner Valley, Home Oil 13, LSD 9, 33-20-3w5, T.D. 7,069 ft., Madison limestone 6,605 ft., initial flow 1,085 bbl. daily after acidizing.

North Turner Valley extension: Maryland Petroleums 1, LSD 8, 18-21-3w5, T.D. 8,723 ft., Madison 8,301 ft., flowing 344 bbl. daily by heads. This is the most northerly producer in the field, ¼ mile northwest of Atlas-British Dominion 2.

British Dominion 5, LSD 5, 17-21-3w5, an outpost well farther east, completed at 8,598 ft., Madison 8,169 ft., acidized in both porous zones, increasing production from 9 to 23 bbl. per hour. Acidizing and testing is being continued. The well is a joint test by British Dominion Oil Corp. and Home Oils.

Texas Gulf Coast

(Continued from Page 70)

P.B. T.D. 8,882 ft., 83.81 bbl. through ⅛-in. choke, T.P. 400 lb., gas-oil ratio 600, perf. 8,874-78 ft.

Esperson, Liberty County: General Crude 1 Stanolind fee, O.W.W.O., old T.D. 8,304 ft., new T.D. in sidetracked hole 8,224 ft., 6 bbl. distillate and small quantity salt water, with 256,000 cu. ft. of gas through ⅛-in. choke, T.P. 850 lb. (S.I. T.P. 2,025 lb.), S.I. C.P. 2,300 lb., perf. 7,765-7,800 ft.

Sour Lake, Hardin County: H. R. Smith 1 Hebert & Ebbetts, S. Jackson Sur., dry at 3,797 ft.

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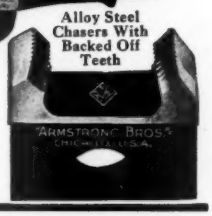

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Among the Drilling Contractors

William Hinton, Tyler, Tex., contractor, has moved a rotary rig to a wildcat location near Donaldsonville, Early County, southern Georgia, where he will drill a projected 6,000-ft. test for Petroleum Exploration Co. of Tampa, Fla.

Fain Drilling Co., Houston, Tex., set surface pipe last week for Continental Oil Co. 6-E Slick, in the Rincon field, Starr County, Texas, and was around 1,900 ft. at 6-D Slick for the same company. Fain has started work on a wildcat, 1 Maroney, 2 miles northwest of Bloomington, in Victoria County, for Continental. It was below 10,100 ft. on 1 Annie Frankland, a Chambers County wildcat, for Arkansas Fuel Oil Co., projected to go to 10,500 ft. In Goliad County, where Continental last May opened the Slick (Wilcox) pool with its 1 Mrs. A. S. Wood, Fain was below 6,900 ft. last week at 2 Wood for the same company. This contractor was below 4,100 ft. at 21 State, near Port Lavaca, Calhoun County, for Stanolind Oil & Gas Co. For Stanolind also it was around 9,000 ft. at 1 South Texas Rice Production Co. on the east flank of the Danbury dome, in Brazoria County.

Brewster-Bartle Drilling Co., Houston, Tex., is drilling 1 Braman in the North Markham field, Matagorda County, Texas, for Sun Oil Co.; 1 M. L. Josey, a wildcat, 3 miles southwest of Cypress, Harris County, a proposed 8,000-ft. test, and 1 Lutcher-Moore Lumber Co., a 12,000-ft. wildcat test 1¾ miles west of Fields, in Beauregard Parish, Louisiana, for Sohio Producing Co.

Southern Drilling & Well Service Co., Houston, Tex., set surface pipe last week for 5 Johnson, in the La Ward field, Jackson County, Texas, to be drilled for Phillips Petroleum Co.

Wynne Crosby Drilling Co., Houston, Tex., finished rigging up this week for 1 Bassett Blakely, in the Clodine area of Fort Bend County, Texas, to be drilled for the account of this contractor and associates. If the test proves to be a producer it will extend production of the Clodine field 3,500 ft. to the west. Crosby last week completed 1 J. E. Jackson, 15 miles south of Anahuac, in Chambers County, as a gas-distillate well at 9,515 ft. This operation also was for Crosby and associates.

Gilger Drilling Co., Houston, Tex., was rigging up last week for 1 Neill, in Fort Bend County, Texas, to be drilled for Grubb & Hawkins. For the same operators it has spudded King Brown Unit 1, in Cass County. Gilger recently completed a surprise oil producer, the E. R. Brann 1 Edgewood

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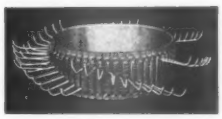

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Land & Logging Co., Ltd., in the abandoned Perkins gas field in Calcasieu Parish, Louisiana, which started off at 165 bbl. daily.

Kerlyn Oil Co., Oklahoma City, Okla., is running four rigs in the Rocky Mountain area. Two rigs are engaged on Montana exploratory wells for Northern Ordnance, Inc., one is drilling a well for Minnelusa Oil Corp. in Wyoming and the other is on a wildcat location for Frontier Refining Co. in western Colorado. D. A. McGee, executive vice president of the company, inspected Rocky Mountain operations last week.

Noble Drilling Co., Ardmore, Okla., has been awarded contract for the Stanolind Oil & Gas Co.'s wildcat test on Beaver Creek, Routt County, Colorado.

Siemoneit Drilling Co., Fort Worth, Tex., has started a wildcat test to explore the Ordovician, 6 miles southeast of the Abell Ordovician pool in Pecos County, Texas, and 4 miles north of the Apco pool. Associated with Siemoneit in the test is E. M. Wahlenmaier, of San Angelo, Tex.

Delta Drilling Co. has staked locations for two new wells and started work on one in the Quitman field, Wood County, Texas. Spotted are B-1 J. A. Blalock and 1 H. H. Green in the S. Calderon Survey. Work has begun on 1 Green.

Drilling & Exploration Co., Dallas, Tex., has moved rig from the west side of the Wasson pool in Yoakum County to the Ownby pool, where it will start on a 14-well drilling program, for its own account.

Davidson Drilling Co., Fort Worth, Tex., has finished plugging back the Skelly Oil Co. 1-K University, a wildcat test east of Emma pool in Andrews County, Texas, and has moved off rig. The well is a new pool opener from the Holt pay in the lower Permian.

Jamison & Pollard, Fort Stockton, Tex., have contract to drill a 3,500-ft. wildcat test for Pure Oil Co., in northwestern Irion County, Texas. Location is 1,980 ft. from west and 660 ft. from north lines of the A. E. Althofer Survey, on the Sugg ranch.

Baldridge & King, San Antonio, Tex., have contract for a 10,000-ft. wildcat test in Willacy County on acreage in the San Juan de Carricitos and Jose N. Cavazos grants. Location is 8½ miles north of Raymondville on the Yturria Brothers Land & Cattle Co. lease.

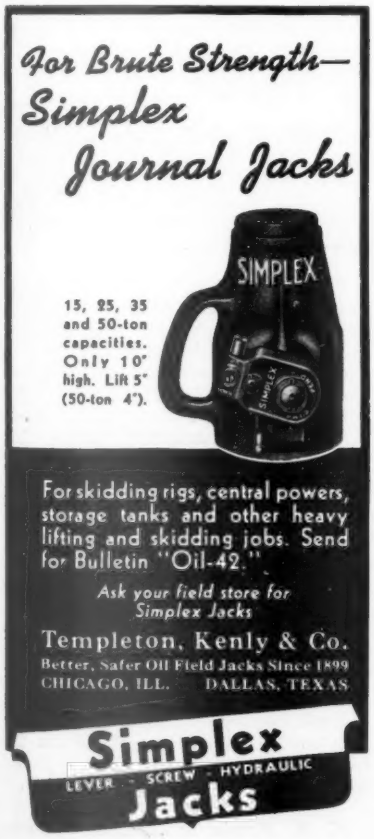
Loffland Brothers, Tulsa and Fort Worth, Tex., contracting firm, will move heavy-duty rotary from Stanolind Oil & Gas Co. and Shell Oil Co., Inc., 1 Blue, Ellenburger discovery in eastern Winkler County, to location by the same operators for 1 R. A. Wheeler, C NW NE, Section 13, Block 7, Public School Lands, ½ mile south of the deep producer.

Rowan Drilling Co., Fort Worth, Tex., has assigned one of its Gulf Coast drilling units to a new location in Jefferson County, 4 miles east of the Fannett field. Location is on the L. B. Broussard tract, 496 ft. from the south and 467 ft. from the west line of a 100-acre tract in the Stephen Eaton Survey.

Mohawk Drilling Co., Evansville, Ind., is moving in cable tools on Central Pipe Line Co. et al 1 Kluth, 1 mile southeast of Shattuc, Clinton County, Illinois, to drill plug after operators set casing above the Cypress.

Olson Drilling Co., Tulsa, has contracted to drill Atlantic Refining Co. 1 Randall, C E½ SW NE 23-22-3w, midway between the Burden and Voshell fields on the west and the Halstead area on the east in Harvey County, Kansas.

Jennings Drilling Co. 1 Robert Vogtsberger, in Block 2, G.E.C.L. Survey, Archer County, Texas, drilled the plug at 4,746 ft., drilled Vogtsberger sand at 4,756-63 ft. Swab was run.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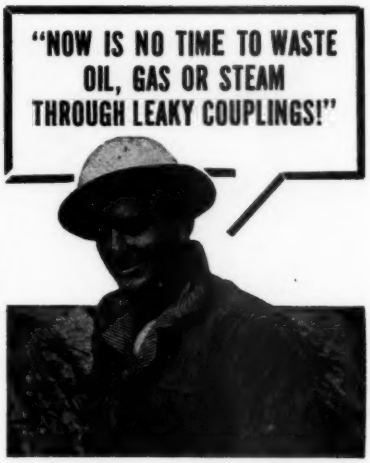

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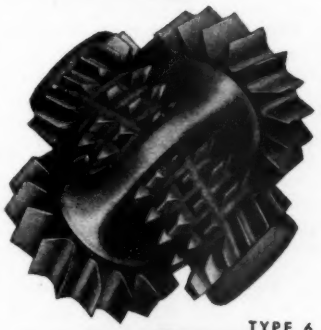

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PERSONALS

J. B. ROGERSON

Lion Superintendent Abandoned Lumber Business For Oil

THE career of J. B. Rogerson, general superintendent for Lion Oil Refining Co., El Dorado, Ark., was plentifully sprinkled with experience in manufacturing and business before he entered the oil industry in 1926 with the company he now serves.

He was born September 28, 1899, at Smackover, Ark., and attended grade and high school at El Dorado. He attended the University of Arkansas 4 years, studying mechanical engineering. During World War I, Mr. Rogerson volunteered in the field artillery and was commissioned a second lieutenant. After his discharge from military service at the end of the war, he returned to the University of Arkansas and graduated, receiving a degree as bachelor of mechanical engineering.

He started work for Allis-Chalmers Manufacturing Co., in the pump and turbine division, Milwaukee, Wis., and was employed in this capacity 2 years. He then returned to Arkansas and entered the lumber business, manufacturing yellow - pine - lumber goods.

Mr. Rogerson joined Lion Oil Refining Co., in 1926 and served as plant engineer, chief engineer and process superintendent before his promotion to the general superintendency. In his 17 years with the company, he has been assigned to design, construction and operation of the asphalt plant, lubricating-oil plant and a modern cracking unit.

He is a member of the American Society of Mechanical Engineers and hobbies are fishing and baseball.

Dr. G. E. Miller, chief geologist for Shell Oil Co., Inc., Rocky Mountain area, was in Great Falls, Mont., arranging for the opening of an office for geological investigations. **Dr. A. S. Huey** will be in charge.

Hallet E. Worthington, a laboratory technician for the Schlumberger Well Surveying Corp., Houston, Tex., until he entered the Army Air Corps, has been promoted to first lieutenant at Wright Field, Ohio, where he is stationed.

William T. Radford, assistant district superintendent for Humble Oil & Refining Co. in the Sand Hills district, Crane County, Texas, has been transferred to a similar post in the Hobbs district, Lea County, New Mexico. He is succeeded by **William A. Watson,** who had been assistant district superintendent at Hobbs. **Homer McCarty** has been transferred from the Chalk district, Glasscock and Howard counties, Texas, to Andrews County, Texas, as assistant district superintendent. **Earl P. Guyton,** district chief clerk, was transferred from the Andrews district to the Hobbs district, exchanging places with **Jacobs P. Roach. Gurney R. Miller** is now chief clerk at the Katy cycling plant, Waller County, Texas.

Lt. G. R. Brainard, formerly exploitation engineer for Shell Oil Co., Inc., Houston, Tex., has been assigned to the proving ground at Aberdeen, Md.

Capt. Paul M. Wiley was a junior petroleum engineer for Texas Co. at El Campo, Tex., when he entered military service as a second lieutenant. At Foster Field, Texas, he was promoted to first lieutenant and later was made assistant post adjutant. Commissioned a captain, he was sent to Washington, D. C., for 2 months, and then to Eagle Pass, Tex., as assistant post adjutant. Captain Wiley is now commanding officer at the Army Air Force Cadet Training School at Shawnee, Okla.

J. G. Dyer, formerly transportation secretary for the District 1 petroleum industry committee, has returned to his company, Sinclair Oil Corp., after an absence of more than a year.

T. O. Allen, formerly district engineer in the Anahuac district, Chambers County, Texas, for Humble Oil & Refining Co., is now an instructor in the U. S. Army Signal Corps, Fort Monmouth, N. J., with the rank of captain. He entered military service in March 1942.

Dr. M. R. Schmidt, assistant general superintendent of the Standard Oil Co. (Indiana) refinery at Whiting, Ind., was promoted to general superintendent, effective July 1, succeeding the late F. D. Rexwinkle. Dr. Schmidt has been employed by Standard of Indiana for 26 years, joining the company as a member of the Whiting research staff in 1917.

Joe B. Rayfield, formerly superintendent of Lone Star Gas Co.'s gasoline plant at Gordon, Tex., has been appointed superintendent of the company's new fractionating plant at Ranger, Tex., which began operations May 15. The new plant processes natural gasoline into special products used in making aviation fuel. Succeeding Mr. Rayfield at Gordon is **Joe F. Francis,** superintendent of the Pueblo plant of the company, and **Lattie M. Cawley** takes Mr. Francis' post at Pueblo.

Carroll Mitchell, formerly district scout for Continental Oil Co. at Midland, Tex., has been appointed district land man there. He succeeds **E. Erie Payne,** who has resigned to operate as an independent.

Edgar H. Fallin, who was formerly employed by the Penn Well Lubricants Co. and later by Shell Oil Co., Inc., for which he was manager of the eastern Pennsylvania district, has been appointed Pacific Coast representative of the Pennsylvania Grade Crude Oil Association, succeeding **Thomas McAuliffe,** who has resigned.

Earl B. Gilmore, president, and **Clarence S. Beesmyer,** vice president, of Gilmore Oil Co., founded by A. F. Gilmore, Earl's father, recently presented service pins to a number of employes on the forty-third anniversary of the founding of the company at the historic old Gilmore ranchhouse in Los Angeles.

Basil Hopper, manager of the manufacturing department of Union Oil Co. of California, recently completed 20 years' service with the company.

H. N. Marsh, production engineer

for General Petroleum Corp. and who also handles the equipment division of the company, is now wearing a 20-year pin. He started with the company in 1923 as a draftsman.

M. T. Hartwell, Midland, Tex., formerly district geologist for Mid-Continent Petroleum Corp., has been appointed manager of the new West Texas operating office opened in that city by Buffalo Oil Co., Dallas, Tex.

E. P. Engelke, Royal Petroleum Corp., was reelected treasurer of the Export Managers at its recent annual meeting in New York.

C. Victory Barry, formerly of Socony-Vacuum Oil Co., Inc., has been appointed chief of the Office of Exports by the Board of Economic Warfare.

Foster B. Parriott was elected chairman of the board of directors of Sunray Oil Corp., Tulsa, last week. Mr. Parriott, whose oil career began more than 30 years ago in West Virginia and Pennsylvania, was president of the Transcontinental Oil Co. from its organization until it was merged with Ohio Oil Co. in 1930. He organized Leader Oil Co., which Carter Oil Co. purchased last year. Mr. Parriott will return to Tulsa in September from Kansas City, Mo., where he has been making his home for the past year.

Harrison Smith, oil man of Oklahoma City, Okla., was in Amarillo, Tex., last week, to play in the Ninth Annual Tri-State Senior Golf Tournament. Mr. Smith is a director in both the Trans-Mississippi and Western Golf Associations.

Leland Whittier, son of **Max Whittier,** California oil pioneer, and a successful oil producer in his own right as well as being a member of the board of directors of Union Oil Co., and several associates have started the first of several projected wildcats to be drilled this year and next.

W. K. Warren, president of the Warren Petroleum Corp., Tulsa, last week was elected a trustee of the University of Tulsa.

Lt. W. H. Keenan, U.S.M.C.R., formerly of Humble Oil & Refining Co., Houston, Tex., has been promoted to first lieutenant. He is in command of two barrage balloon groups on a South Pacific island.

M. L. Terry, Mattoon, Ill., formerly assistant manager of the Oklahoma-Kansas-Illinois division for the Texas Co., in charge of Illinois, has been transferred to Denver, Colo., where he becomes general superintendent of the Rocky Mountain division. **W. C. Kneale,** Salem, Ill., formerly division geologist for Illinois, becomes assistant division manager in charge of Illinois and will temporarily remain at Salem. **J. K. Hufendick,** formerly production superintendent for Oklahoma has been transferred from Tulsa to Salem, where he will be district superintendent for Illinois.

Claude E. Spencer, welding supervisor for Stanolind Pipe Line Co., Tulsa, was announced as this week's "safety ace" and winner of a $100 war bond award by the National Safety Council. The award went to Mr. Spencer in recognition of his development of a number of safety devices in the Tulsa machine shop of the company and for his off-duty safety-training school work.

James A. Webb, petroleum engineer for Lucey Petroleum Co., Dallas, Tex., before entering military service, has been promoted to captain.

Max W. Thornburg, formerly an executive of the Standard Oil Co. of California, and for the past 2 years petroleum adviser to the Department of State, soon will return to private business interests. No date has been set for his resignation and the State Department has not announced a successor.

James E. Pew, formerly superintendent in charge of natural-gasoline plants for Virginian Gasoline & Oil Co., has been appointed assistant director of the Natural Gas and Natural Gasoline Division, Petroleum Administration for War, succeeding **Paul M. Raigorodsky. Charles E. Webber,** employed in natural-gasoline operations of Humble Oil & Refining Co., from 1934 until joining PAW in 1942, has been appointed Mr. Pew's successor as chief of the natural-gasoline section.

G. C. Baker, materials superintendent, and **Ben Beck,** material department, Caribbean Petroleum Co., Maracaibo, Venezuela, were recent visitors in New York.

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Market Developments

East Coast

NEW YORK. — With rail shipments to the East Coast closely approaching 1,000,000 bbl. per day, deliveries to the shortage area are now running in excess of forecasts with the result that the supply situation is showing marked improvement. Total shipments are estimated to have reached almost 1,400,000 bbl. per day, including pipe-line and barge deliveries as well as tank-car shipments. This compares with the 1,360,000 bbl. which had been anticipated for June.

As a result of the improvement in transportation the A.P.I. index of supplies available for civilian consumption rose for the third successive week. This was the first time since late summer of 1942 that three successive increases occurred in the index. Even with this third advance, the current index of 29.5, compares with 50.5 for a year earlier.

Heating-oil coupons for the first period, July 1 to January 1, became receivable during the past week and consumers were urged to fill their storage during the warm months. This may lead to a drain on existing stocks of No. 2 fuel oil which are still low. However, such a decline would represent merely a shift in the location of stocks and would not indicate a decline in the over-all East Coast position.

Mid-Continent

PRESSURE continued this week on Mid-Continent refiners to increase shipments of third-grade motor fuel, indicating that a larger percentage of the current demand is originating in agricultural centers. Of course, refiners are generally practicing manufacturing methods that upgrade a maximum volume of gasoline which, combined with PAW restrictions on motor-fuel production, serves to intensify the pinch on third-grade material.

Limited movement started last week on distillate fuel oils as the OPA and PAW urged heating-oil consumers to start filling tanks as soon as possible. Refiners have diverted most distillate-fuel products to storage since April 1, pending completion of the rationing program for the coming winter.

Shortage of crude-oil supplies continues as one of the dominating factors in Mid-Continent refinery operations. Many of the independent plants are working on a hand-to-mouth basis with little prospect of improvement for the duration. Several are operating only because of special directives from Washington, requiring large purchases to allocate necessary volumes of crude to small plants adjacent to their transportation facilities.

Quotations are firm on all products, generally at ceiling levels. Interrefinery buying is important in current conditions which practically require spreading of all available supplies as much as possible to prevent local shortages.

Gulf Coast

HOUSTON, Tex. — Discovery that several hundred tank cars in the Gulf Coast territory were looking for loads and for places to go caused uneasy inquiries last week. Transportation problems have been the core of refinery difficulties for months, and sudden disclosure that even a limited number of tank cars were waiting for somebody to use them was not easy to understand. Investigation indicated that the freakish development had grown out of a local situation. Unexpected halting of some large refinery shipments had resulted in temporary accumulation of empty cars at Texas City. Refiners at other points in the district needed the cars, however, and it was said that reallocation would give every idle car a job within a few days.

Demand for all refinery products continues to outstrip supply, with scarcity of gasoline a prime cause of concern. "You can't get a gallon anywhere," declared one buyer. "The kerosene situation is almost as bad. Still, you can pry loose an occasional car of kerosene. But gasoline—there isn't any."

Supplies of natural gasoline were far below the level of demand this week. Concentration on manufacture of high-octane motor fuel has made a draft on natural-gasoline plants that is said to be beyond their present production capacity. Such large quantities of natural are going into the making of base stock for aviation gasoline that there is scant picking for refiners who want the material for blending purposes. Demand from the Corpus Christi area has been reported as particularly urgent in recent weeks.

Shipments of No. 2 heating oil were reported to be slightly below output.

Pacific Coast

LOS ANGELES, Calif.—Recent statements by Secretary Ickes that gasoline rationing would be extended in California and along the Pacific Coast later in the year long have been predicted by Pacific Coast oil men.

Demand for military needs will undoubtedly show a substantial increase during the remainder of the current year and spread over into 1944 due to the increased tempo of operations in the South Pacific which are to be supplied from California. As butadiene production is stepped up and aviation gasoline production increased there will be a smaller amount of gasoline for the public, especially in view of the fact that a considerable quantity of fuel oil, diesel, naphtha, lubricating oil and gasoline has been earmarked for government use.

Current demand is abnormally large due to war conditions and the military authorities will get all necessary products. The first cut probably will be a reduction in coupon value from 4 gal. to 3.

In view of this situation, marketers are holding gasoline stocks and will continue to accumulate stocks if possible. Independent marketers who are not able to increase storage stocks, owing to the need of a rapid turnover, will continue as long as possible to distribute on current levels. In the meantime very little trading is apparent, especially between independent marketers.

Prices of all products have remained unchanged for the past several weeks.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)

Week Ended June 26, 1943

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	153	2,426	578	987
Ind., Ill., Ky.	747	16,670	3,332	4,856
Okla., Kan., Mo.	360	6,352	1,612	1,818
Censored area*	1,899	31,438	12,403	13,950
Rockies	104	1,846	622	347
California	752	20,857	49,413	12,086
Total 6-26-43	4,015	79,589	67,960	34,044
Total 6-19-43	3,905	79,806	67,455	33,558
Total 6-27-42	3,597	88,461	77,790	32,206

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
June 26, 1943	242,657,000
June 19, 1943	243,516,000
June 27, 1942	253,364,000

*Excludes unrefinable stocks in California.

Refinery Prices

(Prices as of July 6)

Quotations are f.o.b plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	5.875-6.000	.....	5.500-5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast‡	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	6.125-6.500	6.000-6.125	5.500-6.000	5.000-5.250

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Residual Bunker C§
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	‡1.35-1.45	0.85-1.00
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.65-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200. §Gravity range.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	§1.10-1.15
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3 †36-40 gravity fuel. ‡Pacific Specification 300. §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50
PENNSYLVANIA—		
150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		37.50
10 pour point		36.50
15 pour point		35.50
25 pour point		30.00
200 vis. at 70° F., 3 color:		
Zero pour point		39.50
10 pour point		38.50
15 pour point		37.50
25 pour point		32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Baltimore, Md.	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	10.10
Burlington, Vt.	16.90	5.50	10.20
Buffalo, N. Y.	16.20	5.50	10.90
Dover, Del.	16.70	5.50	12.30
Hartford, Conn.	15.68	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.20	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.95
Pittsburgh, Pa.	16.70	5.50	12.30
Portland, Me.	16.30	5.50	10.20
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.30
Average 14 cities	16.02	5.14	10.85

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	.....
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.30
Average 11 cities	18.34	7.50	10.49

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nex.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero tank wag.
Portland, Ore.	17.00	6.50	13.80
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.80
Average 3 cities	16.17	5.83	13.03
Average 50 cities	16.55	5.96	10.87

Laboratory workers are not "expendable"

Information supplied by "The Oil and Gas Journal"

The laboratory is the "conning tower" of a refinery, its workers the "navigators". Their health and efficiency cannot be endangered.

Ten commandments for keeping laboratories safe:

1. Check ventilating system twice daily.
2. Conduct *every operation* producing fumes under a forced-draft hood.
3. Provide blankets, automatic showers, water pails, unguents and ointments, as fire and first-aid equipment.
4. Avoid equipment and building design with jutting corners, abrupt "drops" or "rises" in floor levels, overhead objects below head level.
5. Keep exits free of obstacles, emergency exit-fastenings readily workable.
6. Have stairways railed, step ladders, chains, stools, etc. in good repair. Place guard rails over moving parts or shafts.
7. Enforce wearing goggles, masks, protective clothing. Inconvenience is no excuse.
8. Provide easily accessible fire fighting equipment, where distillation operations are carried out or where a break of apparatus may cause fire.
9. Install pressure apparatus behind hoods or strong enclosures.
10. Have fire drill system practiced at frequent unannounced intervals.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

MOLYBDIC OXIDE, BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

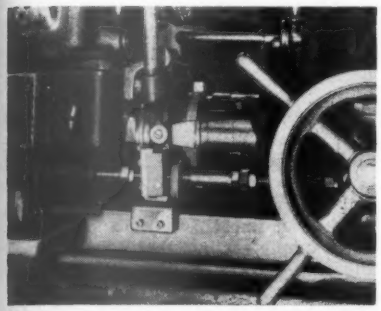
Climax Molybdenum Company
500 Fifth Avenue • New York City

MOLY

Equipment Progress

Quick-Opening Mechanism For Lanco Hardened and Ground Heads

In cutting threads to close tolerances, it is sometimes necessary for the die head to open instantaneously so that the travel of the carriage,



ordinarily required to open the head, will not affect the lead or pitch diameter of the work. A mechanism for imparting this action to the 7V Lanco hardened and ground head applied to the Landis standard bolt threading machine has been developed by engineers of Landis Machine Co., Waynesboro, Pa.

The Landis quick-opening mechanism comprises a spring in combination with a latch and latch block arrangement in addition to the conventional yoke employed to open and close the head. In operation the yoke is employed to close and latch the head within itself. When the head is in the closed position, the yoke also locks independently of the die head. As the yoke closes the head, spring tension is built up in an extension spring, one end of which is anchored to the machine bed and the other end of which is attached to the yoke. As the threading operation progresses to the point where the die head is to be opened, a sleeve on the trip rod raises the latch from the latch block, thus releasing the yoke and permitting it to snap back quickly causing the head to open instantaneously.

The mechanism is fully adjustable for threads of different lengths by moving the latch operating sleeve on the trip rod and by moving the latch block bracket along the ways of the machine. Means are also provided to adjust the tension of the spring.

The quick-opening action mechanism as described can be applied to Landis ⅞-in. single or double head threading machines, which are already in service.

Alloy Steel Products Co. Awarded Army-Navy "E"

Alloy Steel Products Co., Inc., of Linden, N. J., on June 17 was awarded the Army-Navy "E." Ceremonies took place at the plant.

Alloy Steel Products Co. was founded in Boston in 1929 by John H. Davis, Jr., its president and treasurer. A. P. Nelson is works manager. The concern moved to Linden in 1935. The company specializes in the design and manufacture of stainless-steel valves and fittings which are normally used in the chemical, process and food industries for resistance to corrosion, stain and contamination.

Since the war started, the company has devoted its entire production to the war effort, chiefly for Army Ordnance plants producing ammunition.

New Bovaird Store At Pratt, Kans.

Bovaird Supply Co., Tulsa, has announced the opening of a new store at Pratt, Kans., to serve the oil trade in that area. The Pratt store will be managed by Warren J. Miller, widely known in Kansas oil circles and former Bovaird manager at Hutchinson. The new store will carry a complete stock of oil-field equipment. This will make the fourth Bovaird store to be located in Kansas, the others being situated at Chase, McPherson and Russell, with a district office at Wichita.

Plomb Tool Co. Films On Tool Care

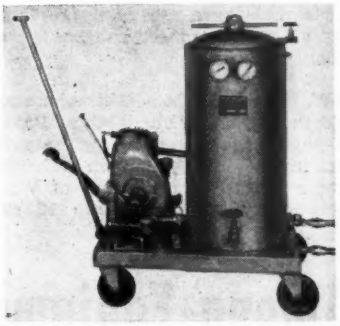
A complete series of six educational talking pictures on the "Use and Care of Hand Tools," prepared under U. S. Army Ordnance supervision by Plomb Tool Co., Los Angeles, Calif., for the instruction of students and mechanics is now being made available to industry and vocational schools at cost, according to F. W. Kirwin, Plomb's promotion manager.

Made up on 16-mm. film, with sound, the pictures may be obtained as a group or singly. They cover practically all of the various types of hand tools in general use, and show correct methods for better, faster, and safer work, together with abuses which should be avoided.

All of them carry the official approval of the Army and Navy as meeting their educational requirements in this field.

Hilliard Introduces Portable Oil Filter

A new portable oil filter unit, manufactured by Hilliard Corp., Elmira, N. Y., consists of a standard Hilco



Hyflow oil filter and a small gasoline engine driving a rotary pump for forcing the oil through the filter. The exhaust gas is passed through a jacket around the filter for heating the filter unit.

This is a self-contained unit convenient for operation in remote sections or at points where electric power is not readily available.

These portable filters are suitable for filtering many types of oils such as those used for lubrication and general use in diesel engines, gasoline engines, steam turbines, steam engines, locomotives, vacuum pumps, gas engines, hydraulic presses, air compressors and airplane engines; also machine tool cutting oils and insulating oils such as those used in transformers and circuit breakers. Filtering of fuel oils is also successfully accomplished.

When operating, the unit is simply wheeled up to the equipment containing the oil, which is piped to the filter inlet, purified and returned to the equipment, or, this same work can be accomplished by installing a dirty oil and clean oil tank. These units are available in sizes ranging from 1 gal. per minute up to several hundred barrels per hour, depending on the type of fluid to be filtered.

Trade Literature

American Locomotive Co., Alco Products Division, 30 Church St., New York, N. Y.—Bulletin 1033, on Alco pipe-line filters. This illustrated folder is featured by a double-spread

drawing of a filter, with all parts numbered and labeled. There is also a page of photographs of typical piping and manifold sections which were made up for pipe-line pumping stations.

Henszey Co., Watertown, Wis.—Bulletin describing the company's new improved flow indicator for water and other free-flowing liquids. Features of the flow indicator are that it is installed right in the pipe line, it reads over the full range of the scale from zero to 100 per cent, the scale is graduated with uniform spaces, there are only three moving parts and these are easily replaced, and all parts are interchangeable with stock parts.

W. H. & L. D. Betz, Gillingham and Worth Streets, Philadelphia, Pa.—A 10-page booklet reviewing the progress made during 1942 in industrial water conditioning. Survey of Water Technology is divided into 10 subjects: A—Water in the War Production Program, B—Water the Raw Material, C—Process Water for Industry, D—Water Treatment, E—Water Analysis, F—Corrosion, G—Boiler Feed Water and Cooling Water, H—Bacteriology and Biochemistry of Water, I—Equipment, J—Recent Books on Water and Related Subjects. Under each of these 10 headings appears a brief description and listing of the important articles written on the subject during the past year.

Athey Truss Wheel Co., 5631 West Sixty-fifth Street, Chicago, Ill. — A new illustrated booklet on preventive maintenance and repair of Athey Forged-Trak Wheels, which combines recommendations for wartime care with instructions on making new parts out of old. It shows how worn parts can be restored to original usefulness through welding, illustrating with pictures various steps of the process being explained.

Among Equipment Men

John L. York Appointed Clark Advertising Chief

Clark Bros. Co., Inc., of Olean, N. Y., recently announced appointment of John L. York as advertising manager.

Mr. York has had many years of experience in the advertising field. He served with the Waltham Watch Co., both in this country and in England and later as advertising manager of the Watson Co., of Attleboro, Mass., and of the Metro Stations, Inc., now part of the Socony-Vacuum Oil Co., Inc. He also served for short periods with advertising agencies.

Brown Instrument Names New Vice Presidents

Appointment of George M. Muschamp and Paul L. Goldstrohm as vice presidents of Brown Instrument Co., a subsidiary of Minneapolis-Honeywell Regulator Co., was announced recently.

Mr. Muschamp will be vice president in charge of engineering and Mr. Goldstrohm will be vice president in charge of production. Both posts are newly created.

Mr. Muschamp, who is 34 years old, has been with the Brown engineering department for 12 years and has been in charge of engineering for the past 3 years. He directed the development of a number of Brown electronic devices, including the electronic potentiometer for controlling industrial temperatures and the Flight Recorder, which is being widely used in testing war planes.

Mr. Goldstrohm, who is 41, recently celebrated his twentieth year with the company. He has been serving for the past 2 years as assistant general manager and formerly was the company's purchasing agent.

Harry Wilson Named Kobe Oklahoma District Manager

Harry Wilson, who until recently was district manager for Kobe, Inc., in charge of West Texas operations, has been promoted to district manager of the Oklahoma district and now has his headquarters at Kobe's division office in Oklahoma City.

Mr. Wilson brings to his new position a well-rounded production experience. After finishing school in 1929, he was employed in the production department of Pure Oil Co. until he became associated with Kobe in 1937 where he contributed to some of the early applications of hydraulic pumping in the Oklahoma City field. In 1939 he was made district manager for Kobe in charge of West Texas and New Mexico, which operations he developed until his recent promotion.

Peterson Named Assistant To Baldwin President

V. H. Peterson, for the past 2 years vice president of Elliott Co., has been appointed assistant to the president of Baldwin Locomotive Works.

Mr. Peterson was educated in Waterbury, Conn., and started work as a draftsman with Scovill Manufacturing Co. of that city. He attended the continuation school conducted by industries of Waterbury, and won a scholarship enabling him to enter Rensselaer Polytechnic Institute from which he graduated in 1925 with a degree in mechanical engineering. He entered the employ of Elliott Co. and, in 1938, after serving as sales engineer in the Pittsburgh office and as district manager of the Rochester and Washington, D. C., offices, he returned to the headquarters office at Jeannette, Pa., as assistant to the president in coordinating the sales activities of the company.

In 1941 he was elected a vice president of Elliott Co. with responsibility for all the sales, advertising and service activities of their three plants, which position he left to join Baldwin Locomotive Works.

American Flange Opens Aviation Department

American Flange & Manufacturing Co., Inc., of New York, N. Y., and Chicago, Ill., makers of Tri-Sure Closures, has opened its own aviation department at its headquarters in Rockefeller Plaza, New York.

Realizing the importance of postwar aviation and with a view to the future, the plans of the company will include special services to the aviation industry, many branches of which are already familiar with Tri-Sure.

The department is headed by T. H. Chamberlain, a pioneer in adapting aviation to ordinary business. Mr. Chamberlain has flown in all parts of the world and was once lost for 2 weeks in the swamps of Central Africa while on a flight from London to Cape Town for a business house as the first air representative to fly to a British colony.

Classified Advertising

EQUIPMENT FOR SALE

INGERSOLL-RAND air compressor 650 C.F.M. and one A.C. 75 K.W. generator set complete with switch board and exciter. 356 West North Street, Indianapolis, Ind.

FOR SALE: Steel Building near Crane, Texas. Standard Butler building with steel framework, size 36' x 140' x 10'. Eleven revolving-type ventilators, twenty-six windows, six doors. Cities Service Oil Company (Pennsylvania), Houston, Texas.

1—60 HP HRT Boiler
1—200 HP Water Tube Boiler
All Sizes Oil Country Boilers
25,000 Feet New 4" OD 14 Gauge
Buttweld Steel Tubing
LUCEY PRODUCTS CORPORATION
Tulsa, Oklahoma

FOR SALE

1—CP 10 x 17 x 10 Type O-CSD Steam Driven Compressor, $750.00.
1—37½ FM Semi-Diesel Oil Engine with extra heavy Fly Wheels, $650.00.
2—75 HP Superior Commercial OF Type Single Cylinder Gas Engine with Clutches, each, $500.00.
1—15 HP Superior Gas Engine, $75.00.
2—18 x 5 x 18 National Transit Horizontal DPP Steam Pump, each $750.00.
1—60 ton Elmes Portable Horizontal Hydraulic press, $250.00.
Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE

1—Bucyrus-Erie, 44L, cable tool well machine equipped with 160 HP Hercules diesel engine. Machine skid mounted. In good order.

J. P. MILLER ARTESIAN WELL CO.
Box 359 Brookfield, Ill.

FOR SALE
ONE MILLION POUNDS

3" Standard Black, Buttweld Pipe, a new, first quality grade; approx. 30% in lengths of 42" to 72"; approx. 70% in lengths of 6' to 13'. Real "blue ribbon" material throughout, free of any rust or pit marks. Also several thousand new, railroad fittings, consisting of flanges, etc. Available for immediate shipment. Will sell all or any part.

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards
St. Clair Co., Illinois

OIL . GAS . GASOLINE
WATER . PIPE LINES

Constructed — Reconditioned — Reclaimed

Complete Engineering if Desired
Survey—Design—Plans—Rights of Way
APPRAISALS

REFINERY PIPING
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Detailed Piping and Engineering Drawings Prepared

MACCO-ROBERTSON CO.
Phone NEvada 6-1225 L. H. Gowdy
CLEARWATER, CALIFORNIA

Over 20 years dependable construction service

EQUIPMENT FOR SALE

FOR SALE: 3 Complete Power Rotary Drilling Rigs with approximately 7000 feet 3½" OD Drill Pipe and 12,000 feet of 4½" OD Drill Pipe. All Waukesha, Butane equipped Motors and Gardner-Denver 14 pumps. These rigs are all running and in good condition. Box 331, Carmi, Illinois.

FOR SALE—72 Beaird Steel Headers, 4" I.D., 2000 lbs. test press.; 30 Brewster Steel Headers, 4" I.D., 3000 lbs. test press.; 30 B.W.Y. C.R. Steel Headers, 4" I.D., High Pressure. ARROW PETROLEUM CO., Centralia, Ill.

FOR SALE: One 7" RB Union Tool Draw Works unitized; one Johnson Jack Shaft type Draw Works unitized. Both in A-1 condition. Inquire T. T. Eason and Company, Enid, Okla.

HOUSTON MACHINE SHOP FOR SALE
$20,000.00
Very profitable jobbing business; wonderful post-war possibilities. For sale account owner's health. Address—P.O. Box 1122, Houston, Texas.

FOR SALE: Four 10 x 4½ x 10 Duplex Steam Pumps, make Worthington and Gardner-Denver. Good condition. Inquire T. T. Eason and Company, Enid, Okla.

FOR SALE: Medium size COOPER WINCH, unitized with V-8 Motor and HEAVY-DUTY telescoping mast. Price $1600.00. Wichtex Machinery Co., Wichita Falls, Texas.

3—94' WERME steel derricks, 330,000# API test, excellent condition. $725 each or all for $2000. Priced for immediate sale, FOB Oklahoma City yard. Roger Miller, 1101 First Nat'l Bldg., Oklahoma City, Okla. Phone 2-6301.

DIESEL—GAS—ENGINES

Large selection — All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.

Complete information on request.

A. G. SCHOONMAKER COMPANY
48 Church Street, New York, N. Y.

3 ROTARY PUMPS

2—90 GPM Viking 3 HP, 3 Ph. 60 Cy. 220 V. Single Pumps.
100 GPM Blackmer 3 HP, 3 Ph. 60 Cy. 220 V. Double Pump.
PUMPS BOUGHT AND SOLD

L. M. STANHOPE
Wayne, Penna.

Used Engines and Compressors
We Rebuild and Guarantee
L. F. SMITH CO.
217 W. Archer, Tulsa, Okla.

6000 ft.—4" Extra Heavy New Pipe plain ends

Duplex and Single Steam Pumps—several sizes

ARROW PETROLEUM CO.
7419 Franklin Street
FOREST PARK, ILL.

EQUIPMENT FOR SALE

FOR SALE: 2—110 HP Miller Compressors, horizontal type, gas prime mover, 80# intake, 365# discharge, 180 RPM. BANKOFF SUPPLY CO., Box 2301, Tulsa, (1), Okla.

FOR SALE: 2 light plant units—one PA-100 International with 50 KW-Generator and exciter, other unit PA-50 with 35 KW Generator and exciter with switchboard. J. W. Monfort, Alva, Okla.

FOR SALE: Four National oil and gas Separators, 7' by 22' 6", 80# WP. Seminole Field. EMCO EQUIPMENT CO., First Nat'l Bldg., Oklahoma City, Okla.

FOR SALE: 22 ft. Base, and 14 ft. high, new U. S. Steel Sub-Structure, complete with double stairways and bannisters. Bargain.

CAPITAL COMPRESSED STEEL CO.
Oklahoma City, Oklahoma

55,000 BBL. steel tank at very attractive price to party assisting in moving other material in deal. Box B-632, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE
STIRLING BOILER TUBES

35,000 Feet seamless, first class condition.
3¼ O.D. lengths 12' to 16'
12½ cents per ft.

SOUTH TEXAS PIPE & SUPPLY CO.
Corpus Christi, Texas. Box 476

LEGAL BLANK

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

WANTED

COMPLETE Plants, Pipe-Lines, and Industrial Enterprises bought for cash or liquidated for the owners. Wire, phone, or write—INDUSTRIAL SUPPLY & EQUIPMENT CO., INC., 1044 Canal Bldg., New Orleans, La.—MA 5586.

PATENT ATTORNEYS

PATENTS, Trade-Marks, Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg., Washington, D. C.

Crude-Oil Prices

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80		$1.06	$0.70
19-19.9	.84			
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9		1.07	1.30	.94
32-32.9		1.09	1.32	.96
33-33.9		1.11	1.34	.98
34-34.9		1.13	1.36	1.00
35-35.9		1.15	1.38	1.02
36-36.9		1.17	1.40	1.04
37-37.9		1.19	1.42	1.06
38-38.9		1.21	1.44	1.08
39-39.9		1.23	1.46	1.10
40 and above		1.25	1.48	1.12

*Includes Lea County, New Mexico.

Journalisms:

THE use of automobile engines for power and as compressors is almost as old as the idea of secondary recovery itself. The difficulty of obtaining materials under wartime conditions has increased interest in this substitute for normal compressors and the Illinois State Geological Survey has conducted experiments designed to determine its efficiency. The results of these experiments together with a description of the method of converting an engine to a compressor will be described in next week's Engineering and Operating Section by Frederick Squires of the survey staff.

A MOST important contribution to the science of viscosimetry will be presented in next week's Journal by C. M. Larson and W. C. Schwaderer, Sinclair Refining Co. Viscosity data are scattered through a multitude of publications and a compilation of these data in a single reference in itself constitutes a valuable contribution. The authors go farther than this, however, and "to facilitate the task of making an intelligent selection of oils on a viscosity basis and to eliminate cumbersome computations, interpolations, conversions and alignment charts" present four new viscosity classification charts which show at a glance (a) viscosity index, (b) kinematic and Saybolt Universal viscosities, (c) S.A.E. numbers, viscosity crankcase oil classification, (d) automotive manufacturers' viscosity classification, (e) S.A.E. numbers, viscosity transmission and axle lubricant classification and (f) viscosity-temperature relations. The paper contains numerous examples of the way in which the charts can be used in determining the properties of oils, in blending oils and in determining dilution.

THE tendency to reduce highly variable procedures to standardized formulas will be discussed in a staff article in next week's issue in which the author will discuss three generally accepted statements regarding pumping wells. These statements are "Never pump a well off," "Always pump off bottom," and "Get the pump as near bottom as possible." Sometimes these are incorrect procedures. Recognition of conditions which make these practices undesirable and procedure to be followed will also be taken up in detail.

AMONG the many inducements offered to wildcatters, a bonus allowable is becoming more popular. Oklahoma and Texas are among the states having such regulations and attempts are being made to liberalize them. However, the granting of an increased allowable may have little effect if no purchaser can be found to take the oil. PAW production committee for District 5 has granted higher allowables for California discoveries provided no offset is drilled before the allotment is produced, the rate of production does not exceed that determined as proper for the well, the oil can be sold and none of the gas will be wasted. This incentive may benefit prospectors in areas near producing fields but the qualifying provisions may not permit application of the principle to discoveries in new areas.

CALENDAR

July

PETROLEUM INDUSTRY WAR COUNCIL, regular meeting, Washington, D. C., July 14.

PAW DISTRICT 3 PRODUCTION COMMITTEE, regular monthly meeting, Lansing, Mich., July 16.

KENTUCKY OIL AND GAS ASSOCIATION, annual midyear meeting, Ashland, Ky., July 24.

September

AMERICAN CHEMICAL SOCIETY, petroleum division, fall meeting, September 6-10. Place not yet determined.

October

AMERICAN GAS ASSOCIATION, twenty-fifth annual meeting, Jefferson Hotel, St. Louis, Mo., October 11-13.

MID-CONTINENT OIL AND GAS ASSOCIATION, annual meeting, Blackstone Hotel, Fort Worth, Tex., October 14-15.

November

AMERICAN PETROLEUM INSTITUTE, twenty-fourth annual meeting, Palmer House, Chicago, Ill., November 8-11.

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